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ORIGINAL ARTICLES.

THE PRESENT STATUS OF SERUMTHERAPY IN TYPHOID FEVER.¹

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IN view of the very successful results that have been obtained by the serum treatment of diphtheria and the preventive therapeutics of rabies, the question naturally arises as to why no great success has followed very numerous attempts to affect favorably the course of typhoid fever by serumtherapy. On many grounds a comparison of the clinical features and pathological characters of diphtheria and typhoid fever would seem to indicate the latter disease rather than the former as the one more favorable for the successful inauguration of a system of serumtherapy.

Diphtheria is a disease which commonly develops with great rapidity and without announcing its advent by distinct premonitory symptoms. Its focal lesion in the pharynx often reaches extensive development in a few hours; its toxins are thrown into the circulation in overwhelming doses and produce grave cellular alterations in vital tissues in the first stages of the malady. Typhoid fever, on the other hand, is slowly ushered in, as a rule, by several days of premonitory symptoms or mild illness, serious anatomical lesions are not present till the second or third week, ample time is offered before either the intestine is gravely damaged or the internal viscera exhibit degenerative changes for the administration of any agent that may have power to inhibit the growth of the bacillus typhosus or to neutralize its toxins. Yet the mortality of diphtheria has been greatly reduced by specific antitoxin treatment, while typhoid fever has long remained untouched and almost unapproached by advances in the knowledge of artificial immunization.

It may be of interest to point out some of the reasons which may be advanced to explain this failure to solve the problem of successful serotherapy of typhoid fever. In the first place it develops more clearly each year that there are fundamental differences in the nature of these two bacterial diseases which were long overlooked. In diphtheria the bacteria multiply rapidly on superficial mucous surfaces and seldom reach the general circulation, producing their effects by diffusible toxins absorbed from the focus of infection. Successful isolation of the bacillus diphtheriae from the circulating blood is of rare occurrence, and the few cases in which it has been accomplished serve only to demonstrate the almost invariable rule that in fatal diphtheria the

blood is free from the specific bacterium of the disease.

In typhoid fever, while earlier and several recent studies by Pasquale, Thiemich, Kraus, Ettlinger, Stern, James and Tuttle, Neuhaus, Fränkel, and Klein, indicated that the blood seldom yields positive culture of bacillus typhosus, very recent reports from several sources prove that with more careful technic the bacillus can be isolated from the blood in the majority of cases, even comparatively early in the disease. This conclusion has for some time been favored by the increasing proportion of successful attempts to obtain the bacillus from the cutaneous lesions. Thus, Soudakoff and Thiemich obtained the bacillus in fifty per cent. of their cases from the rose spots, and more recently Neuhaus obtained it from the skin in thirteen of fourteen cases.

Regarding the occurrence of the bacillus in the blood Kraus and Kuhnau showed that there is a type of typhoid septicemia in which the microorganism is practically always to be isolated from the blood. During the past year several studies have shown that even in routine cases a much higher proportion of successful results may be obtained than had been regarded as possible. Thus Castellani was successful in twelve of fourteen cases. Schotmuller has contributed an important study of sixty-eight cases in eighty-five per cent. of which he found the bacillus in the blood. He distributed twenty c.c. of blood from the basilic vein in several flasks containing from 200 to 300 c.c. of broth, the dilution nullifying the bactericidal action of the blood, while the large bulk of blood tended to insure a successful result if any bacteria were present. This result emphasizes the absolute necessity of drawing conclusions in this field only from the use of considerable quantities of blood. Almost equally successful were Auerbach and Unger, who planted only from ten to thirty drops of blood in 300 c.c. flasks of bouillon. Examining the broth in hanging drops they sometimes found at first a very scanty growth of non-motile rods or threads which, when replanted on fresh broth free from blood, gave an abundant growth. With these small quantities of blood they had seven positive results in ten cases.

These studies and others of similar import which are known to be in progress prove that typhoid fever in the great majority of cases, whether fatal or favorable, is a form of septicemia; and, as many features of the disease have led us to suspect that the symptoms of typhoid fever are not referable so much to the intestinal lesions as to the presence of the bacteria in the blood and viscera, the increasing frequency of reports of typhoid infection without intestinal lesions thus becomes quite intelligible.

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Typhoid fever therefore is largely a bacteremia, while diphtheria is a toxemia.

Another important addition to the knowledge of typhoid fever has resulted from recent bacteriological studies of the blood and the investigation of the agglutinative properties of the serum, which tend to show that there is a wide variation in the characters of the bacteria concerned in the disease. Babes was among the first to point out various marked differences between cultures of bacillus typhosus isolated from typhoid cadavers. Some of them produced gas and indol, properties which tended to throw them into the colon group. He usually obtained from the same cadavers cultures of typical typhosus, and, while denying emphatically that the irregular types were capable of producing typhoid fever, he admitted that they probably influenced the character of the disease, since they acted in animals just as did typhosus. Many observers have reported extreme differences of virulence in cultures obtained from typhoid cadavers. Remy finds that when typhosus is grown along with colon bacillus the former loses its susceptibility to agglutination and may be so far altered as to be unidentifiable by any or all of our present means.

On the other hand, studies of the colon bacillus have shown that this species very frequently develops characters which render its separation from typhosus extremely difficult. Sternberg isolated several species of coli from water which failed to produce indol or gas or to coagulate milk, but were agglutinated by high dilutions (1-10,000) of typhoid serum. Deeleman also obtained colon cultures which produced no gas and did not coagulate milk. Remy finds that when grown with typhosus the colon bacillus regularly loses its capacity to produce gas and indol. Jatta found that he was able to isolate from diarrheal stools at different periods of the disease different types of coli which varied in their capacity to coagulate milk and were agglutinated in varying degrees by blood serum.

The hope that the agglutination test would prove a ready means of separating typhosus from the colon bacillus has not been realized. Stern found that typhoid serum may agglutinate coli even more strongly than typhosus, especially colon cultures from the stools of the typhoid patients whose serum was employed in the test. Widal and Nobecourt found a patient whose serum agglutinated typhosus only in 1-20 dilution, but clumped a culture of coli from an abscess in a dilution of 1-12,000. Eight days later the serum had no effect on typhosus while retaining its power over the colon bacillus. Beco concluded that typhoid serum agglutinates most colon cultures, sometimes very actively but always less strongly than typhosus, if an extremely powerful serum be used.

This conclusion, while generally holding, has found exception in the experience of Widal, Sternberg, Remy and Jatta. Moreover, Jatta showed that this high agglutinating power of typhoid serum over the colon bacillus could not

be referred to secondary infection by the bacillus coli, since it was present in the serum of animals receiving injection of typhosus only. Not only has the agglutination test failed to distinguish typhosus from coli, but it appears to be unable to separate all cultures of these germs from other more distantly related members of the intestinal flora, since it has been shown by Gruber, Durham, Sternberg, Deelman, Remy, and many others, that typhoid serum even in comparatively high dilutions may agglutinate Gaertner's bacillus enteritidis, Nocard's bacillus psittacosis, and Petruschky's bacillus fecale alcaligenes.

The accumulating evidence of studies in these related fields seems therefore to justify Durham's division of this entire group of intestinal bacteria into three, instead of two, classes, and to warrant the common application of the term "Gaertner's group" to those species intermediate between typhosus and coli, with which the production of gas and indol and the coagulation of milk, while often present in traces, are too uncertain to warrant their acceptance either as genuine typhosus or as genuine coli. An important practical bearing of these conclusions was not apparent until bacteriological studies of the blood of typhoid fever began to show that the typical symptoms of this disease may be associated with the presence in the blood, as the undoubted etiological agent, of bacteria which produce gas and indol, coagulate milk, and are not agglutinated by typhoid serum.

The credit of having first drawn definite attention to the fact that some irregular forms of typhoid fever are referable to infections by bacteria intermediate in type between Eberth's bacillus and the colon bacillus belongs originally to several French observers who combined the results of study of the bacteria isolated from the stools and the agglutinating properties of the serum of these patients. Achard and Bensaude appear to have published the first complete description of a case of this type in 1896.

In 1897 Widal isolated from an abscess in a phthisical patient a bacillus resembling coli, but producing no indol and not fermenting lactose, while the patient's serum, which had no effect on typhosus or on cultures of genuine coli, agglutinated this bacillus in dilution of 1-1,000. In 1898, Gwyn isolated from the circulating blood of a case of typhoid fever a bacillus which produced no indol and did not ferment lactose, but fermented glucose, while the patient's serum, inert with typhosus, agglutinated this bacillus in 1-200 dilution. Shortly before this Brill had described an epidemic of typhoid fever of a type which probably belonged in this class, since in none of the eighteen patients was Widal's reaction obtained. Unfortunately there were no bacteriological analyses of the blood, while cultures of the stools yielded the colon bacillus. More recently Schotmuller, in five of sixty-eight routine cases of typhoid fever, found bacteria in the circulating blood which on biological characters must be classed as intermediate between bacillus

typhosus and bacillus coli. These cases were usually of mild type and not such as might be expected to show bacteremia. The blood sera failed to agglutinate cultures of genuine typhosus, but acted strongly on the bacillus obtained from the blood in each case, and all of five sera agglutinated all the cultures in the series. In about the same proportion of cases, five out of sixty-two, studied by Kurth, the diagnosis of paratyphoid infection was made, either by the presence of specific agglutinating properties in the serum, or from the isolation from the stools, or urine, of bacteria which produced no indol, fermented glucose, and in other characters resembled Gaertner's group. These cultures lost their virulence when heated to 60° C. and were harmless when administered by mouth to guinea-pigs and rats. The serum of these patients had no effect upon bacillus typhosus nor on bacillus enteritidis, but actively agglutinated the particular cultures isolated from the stools.

Rodet recently isolated from three typhoid cadavers bacilli which produced no indol and no gas, but grew on potato like the colon bacillus. The initial cultures were indifferent to both typhoid and colon serum, but subcultures were agglutinated by both sera in high dilutions, most actively by the colon serum. Animal inoculations gave a serum which actively agglutinated typhosus. These apparently contradictory results belong to the class on which is based Roux's theory that the colon and typhoid bacilli are identical species with varying and interchangeable physiological properties. The exact characters exhibited by one representative of the paracolon group of bacteria, isolated from a case of post-typhoidal osteomyelitis, have been very minutely studied by Cushing.

The above observations indicate clearly the importance of recognizing the paracolon or Gaertner group of intestinal bacteria as rather frequent excitants of diseases which may be clinically indistinguishable from typhoid fever. They serve to explain the failures of Widal's reaction which are constantly being reported, and they point out the necessity for testing suspected typhoid serum both on genuine typhosus and on cultures of this paracolon group as well.

We have thus far shown that typhoid fever differs from diphtheria, first, in being a septicemia rather than a toxemia; and, second, in that the bacterial agent in the disease, not to mention secondary infections, may show wide variations in its biological characters and in the quality of the agglutinating substance which it causes to be elaborated in the system. Moreover, the toxic products of bacillus typhosus differ radically in their clinical qualities from diphtheria toxin, while their relation to the symptomatology of the disease is very uncertain. Typhotoxin differs from diphtheria toxalbumin in being slowly soluble in water, hence resembling globulin rather than serum albumin. It differs from globulin, moreover, in being very slowly soluble in NaCl. According to Martin it does not possess the diges-

tive properties of diphtheria toxin. Typhotoxin kills rabbits and guinea-pigs very slowly; diphtheria toxin kills them very rapidly (Breiger, Fränkel). In neither animal does it give symptoms of lesions similar to those of typhoid fever, even when acting energetically; yet Remlinger produced rather typical lesions of typhoid fever in rats and rabbits by feeding them on cabbage-leaves soaked in cultures of bacillus typhosus. Peyer's patches were swollen, there were ulcers in the colon and the spleen and lymph-nodes were hyperplastic. Recently, Walker induced typical lesions of typhoid fever in rabbits by combining successive inoculations of typhoid cultures with immune horse serum and serum extract. Sanarelli grew typhosus in broth for a month in the thermostat, then for eight months at room temperature, finally killing and macerating the bodies of the bacilli at 60° C. for some days; 1.5 c.c. of this extract per 100 grams of guinea-pig killed in twenty-four hours, with bloody diarrhea and lesions which showed a very slight tendency of the toxin to pick out lymphatic structures, but with no specific lesions in Peyer's patches. Martin found the filtrate of virulent cultures to kill animals with subnormal temperatures, but with no specific lesions. Bodies of the bacilli killed by chloroform were much more toxic, but even then did not specially affect Peyer's patches. Bacillus enteritidis gave somewhat similar results.

We may conclude, therefore, that the bodies of typhoid bacilli contain poisons which do not diffuse rapidly in fluids as does diphtheria toxin and which are incapable of producing the specific lesions of typhoid fever. Not only has no specific typhotoxin been isolated from test-tube cultures of bacillus typhosus or from the cadavers of typhoid patients, but Chantemesse and Widal, Gruber and Durham, and many others, have shown that the procedures which render animals immune to infection by the typhoid bacillus are incapable of protecting them against infections of the products and macerated bodies of these bacteria.

The problem of the serumtherapy of the disease is therefore the preparation of a serum which is principally bactericidal and not antitoxic as in diphtheria. It was at first believed that the agglutinating substance represented the essential principle in preventive sera in typhoid fever, but it has gradually become clear that, while the agglutinins are usually abundant in strongly protective sera, such active sera may exhibit very little agglutinating power. Pfeiffer has shown that cholera serum may lose almost all its agglutinating properties while retaining a high degree of protective power. Deutsch, among others, has made very careful observations on the development of agglutinins and of protective substances in the blood of inoculated animals, finding that the two curves are generally but not always parallel, and never superposable. He concluded that all strongly agglutinating sera are also strongly protective, but that highly protective sera may contain little agglutinin.

Although immune serum usually contains both bodies at the same time and loses both in about equal proportions when heated or inoculated with typhoid germs (Gruber and Trumpp), by a comparison of the agglutinating powers of many sera, Pfeiffer and Kolle, Fränkel and Otto, and Deutsch have concluded that these properties have no necessary relation to each other, and certainly do not reside in identical substances. Their conclusion accords with the fact that the highly protective diphtheria and tetanus sera are not agglutinative, while the agglutinating typhoid and cholera sera cannot be made to show highly protective qualities.

Again, several studies have shown that agglutination depends to a large extent upon the characters and condition of the bacteria themselves and is only partly determined by the quality of serum with which they are treated. Johnson found that actively growing cultures of typhosus often tend to agglutinate spontaneously, while slowly growing attenuated cultures do not. Durham found that of sixteen different vibrios the less virulent races were much more susceptible to agglutinins produced by virulent cultures than were those virulent races themselves. Walker's observations seem to show conclusively that typhoid cultures showing greater tendency to spontaneous agglutination and agglutinating more strongly in immune serum are the less virulent cultures. The most that can be claimed is that the agglutination is not the essential feature of protective serum, that agglutination depends very often upon special tendencies of the bacterial species rather than upon the presence of much bactericidal substance in the serum, but that agglutinative power is, however, in the majority of cases, a fairly reliable index of the protective power of a serum.

Serumtherapy in typhoid fever therefore demands the preparation of a principle which is not largely antitoxic, which indeed is not to be measured by its agglutinative powers, but one which responds to the far more critical test of protection by a mechanism which has thus far largely escaped recognition. This means probably that it must be both antitoxic and bactericidal. The evidence that both these properties are demanded may be gathered from the results, on the one hand, of Brieger, Kitasato, Wassermann, Beumer, Peiper, Sirotnin, Bitter, and Bruschetini, all of whom prepared protective sera which were more or less antitoxic, and, on the other hand, of Pfeiffer and Kolle, Funk and Bockenham, and Sanarelli, whose actively protective sera were slightly or not at all antitoxic.

We may now consider briefly what steps have been taken with or without regard to the foregoing principles and what success has been achieved in the preparation of a protective serum for typhoid fever in the human subject. Bockenham inoculated horses, first with the filtrate of typhoid cultures, then with the killed cultures, and then with both alternately, thus securing a serum of considerable bactericidal power and with active

protective and curative powers in animals. Pope and Cowen tested this serum on the human subject in a few cases with results which seemed to them more favorable than those secured by any other plan of treatment of the disease. Immediate improvement followed each injection and the course of the fever appeared to be distinctly shortened. Bockenham's serum was prepared, however, without special regard to some theoretical requirements. The first of the theoretical difficulties was recognized by the endeavor to produce a polyvalent serum, i.e., one that would protect against a considerable variety of races, each with special characters, which, as has been shown, may be concerned in the disease. Each of these races seems to require an extremely specialized bactericidal agent and some may be little affected by a serum which rapidly destroys other races of bacillus typhosus. This difficulty was foreshadowed by the conflicting results of Widal's test, the serum of some convalescent patients failing entirely to agglutinate particular cultures of typhosus, at least partly because the serum did not contain the special agglutinin for that culture, although probably quite capable of agglutinating a bacillus which came from the patient's own intestinal tract.

This idea of the necessity of a polyvalent serum was first suggested by Bockenham in connection with the manufacture of antistreptococcus sera. The idea was followed up systematically by Tavel and Walker, who inoculated horses for a period of from one to three years with several species of bacillus typhosus, finding that the specialism in the immunizing bodies required to protect is very marked and that greater specialism is demanded as the protective qualities increase. These results probably indicate the real difficulty in the preparation of practically effective sera for the human subject. Although Walker secured enormous agglutinative powers in his horses (1-2,500,000), this power was exhibited only against the particular culture longest employed in the inoculations. Against other cultures its agglutinative qualities were far less and proportional to the length of treatment by each culture. Tavel tested serum drawn after one year's treatment of horses, on typhoid patients, finding that it abolished the plateau stage of pyrexia, the fever falling by lysis and the patients making rapid recovery. Other cases treated by two-year serum are soon to be reported, and three-year polyvalent serum is now being tested (Walker).

A second practical step in advance followed the recognition that the protective substances are not equally distributed in the body. Johnson and McTaggart found that the whole blood possesses more agglutinins than the serum. Wassermann (1899) tested the protective qualities of extracts of the different organs and concluded that the typhoid antibodies are produced in the spleen; but almost at the same time Roth's studies in a similar line led to negative conclusions. Jatta's studies indicated that within from two to three days after inoculation the agglutinins

of the spleen exceed those of the blood serum, but later the serum is always the stronger. He did not test the protective qualities of the spleen and his results were amplified by Castellani, who found that while the serum contains more agglutinins the spleen has more protective bodies.

Deutsch took up the matter in a systematic and exhaustive manner. He found that the spleen and marrow usually show greater bactericidal power than the blood serum, which he attributed to the abundance of leucocytes in these organs. Yet in splenectomized animals bactericidal properties developed as in the normal animals, indicating that the function of the spleen may be fully assumed by other tissues. Bactericidal substances made their appearance on the fourth or fifth day of infection, simultaneously with the disappearance of leucocytes from the peritoneum, the site of inoculation. Removal of the spleen on the third day greatly reduced the animals' chances of recovery apparently through the removal of already formed bactericidal substances. The lymphatic organs contained less agglutinin than the serum. Agglutinins developed perfectly in splenectomized animals, but splenectomy on the third to fifth day of infection sometimes prevented their formation. He found marked discordance between the bactericidal and agglutinating properties of the spleen, and hence concluded that these properties reside in different substances. Deutsch made the interesting discovery that lung tissue in the early stages of infection has from ten to twenty times as powerful agglutinating action as the serum. Later, the difference was not so great. Normal lung was also found to be from ten to twenty times as active as normal serum of guinea-pigs.

These researches of Wassermann and Deutsch represent the acme of progress in the investigation of immunity in typhoid fever, and they culminate, as have many previous studies, with strong indications that immunizing bodies are the product chiefly of the colorless blood and lymph-cells. Daubler's partly contrary results in this field, however, here deserve mention, since this investigator found that during the process of immunization against typhoid infection the leucocytes and purulent exudates do not increase in bactericidal properties, but remain the same throughout.

The above results have to some extent received a practical test on the human subject in the attempt of Jez to influence typhoid fever by injections of visceral extracts from infected animals. Proceeding from the principle that the normal central nervous tissue possesses both preventive and curative properties in tetanus, Jez tried extracts in glycerin, alcohol, salt, broth, and water, of the liver, spleen, lymph-nodes, thymus, marrow, brain and cord, of healthy rabbits, administering them subcutaneously and by mouth, but without effect on typhoid infection of rabbits. He then inoculated rabbits with 10 c.c. of typhoid culture, the animals dying on the fourth day. Extracts in alcohol and water of the thymus, spleen,

marrow, brain, and cord proved actively preventive, when 10 c.c. were injected with 10 c.c. of culture. An extract of the above tissue made with alcohol, water, salt, and glycerin, to which a trace of carbolic acid and pepsin was added (details not given), had no bactericidal action in the test-tube and gave no Widal reaction; but when given hypodermically is said to have had a surprising effect upon the course of typhoid fever in eighteen cases on which it was tried. The fever was reduced, pulse improved, sweats induced, and the general nervous condition much improved. Glucksmann failed, however, to obtain any curative action from Jez's extract on typhoid infection in rabbits, and Walker, replacing Jez's extractive solution with curative horse serum, failed to find any greater curative powers than were obtained from horse-serum alone. Jez's results lack, perhaps, the scientific certification of the work of Tavel and Walker, but represent a line of work in the right direction.

Another independent line of investigation has been carried on by Chantemesse in Paris, from which, especially successful results have been expected, inasmuch as this investigator claimed, in 1898, to have devised a method capable of furnishing extremely active and specific typhotoxin. Chantemesse cultivated the bacillus upon the filtrate of an emulsion of splenic tissue digested with pepsin, carefully avoiding access of air during the manipulations. The fluid thus secured was found to be extremely toxic, especially for horses, but on exposure to air rapidly lost its poisonous properties. Horses were very susceptible to minute doses for at least one year, after which they developed increasing immunity and their blood serum became strongly bactericidal and both curative and preventive for animals. The results of the treatment of 100 cases of typhoid fever with Chantemesse's serum have recently been reported. The total mortality was 6 per cent., which is not better than the results obtained in many such series of cases treated by ordinary methods. Yet two patients began treatment on the twenty-first and twenty-fifth days when already suffering from pneumonia with a pulse-rate of 140. A third case was that of a very fat woman who could not be bathed; she died of a large bed sore present on admission. Three of the patients died of perforation, against which the treatment seemed of little avail. On the other hand, all patients treated before the tenth day recovered. The serum usually caused a rapid and steady defervescence. Or the temperature rose again, the relapse being more severe than the original fever, but a second injection caused a rapid lysis of fever. The injection of the serum invariably caused a pronounced improvement in the general symptoms, as attested by all the clinicians who observed the course of Chantemesse's treatment in the Paris hospitals.

It remains for investigators who possess experience and extensive equipment to combine and extend the results already obtained in the two aforementioned fields and to determine what

success can be secured in the treatment of typhoid fever by injections of serum and visceral extracts from animals which have been treated with a view to producing polyvalent immunizing bodies. It would appear that the outlook in this field is fairly indicative of success, if not in the preparation of a curative serum for typhoid fever, then at least in essential progress in the knowledge of artificial immunization both in this disease and in other infections which have heretofore baffled all attempts at serumtherapy.

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SURGICAL COMPLICATIONS OF TYPHOID FEVER.

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It would be strange, indeed, if the very complicated human body were swarming with untold myriads of disease-producing bacilli of typhoid fever and no trace were left of surgical complications. Judging from my own experience in past years, the physician, as such, is apt to regard this disease as rightly relegated to the domain of medical practice; so that it is profitable for a few moments to review the surgical conditions which are

occasionally seen in connection with or sequent upon the few weeks of fever.

An analogous series of complications may be found in other infections, such as that of tubercle, and we can see why much the same causes bring about similar complications. The study of one aids us to understand the other. A more perfect research of tubercle infection has been made far in advance of any other, because it is a more readily demonstrable bacillus, its life course is slower and the experimental research more satisfactory. But one fact derived from the research of tubercle infection can be mentioned at this point to elucidate corresponding facts in the subject we are to discuss. It has been demonstrated that when tuberculous fever is induced in animals and a local injury (such as fracture of a bone, injury of a joint, or local irritation of an internal part) takes place, there is a local demonstration of the disease. The same is true of pyogenic coccus infections. We have but to enumerate the varied surgical troubles incident to typhoid fever and we see at once the relation of cause and effect—the colonizing of bacilli at the site of injury. This point should be ever present in the mind of the physician.

To begin with, let us notice the bone abscesses which most practitioners have encountered in the late weeks of occasional typhoid cases. They have been seen in almost every bone of the body, but the relative frequency with which they occur in such parts as are subject to bruises is so far an argument of their causation that one is struck by the fact. The tibia, which by its exposed position is most subject to injury (or what the Germans call "insults"), is most often the seat of abscess. Taken altogether the bones of the lower extremities are oftener affected than all others of the body, as 112 to 104, according to Keen, while, considering the bones nearest the surface, compared with those buried under muscle or within the body, we find the contrast is 180 to 51.

Enough is thus in evidence to show that a slight accidental injury to the patient will often determine a swarming of the prevalent bacteria to the part, which the weak resistance of the tissues fails to conquer, and an abscess results. In most of these a culture of the pus reveals a pure culture of the typhoid bacillus, but in others a mixed staphylococcus and typhoid, and in some a pure staphylococcus. This latter demonstration is consistent with the complicated toxemia of mixed infections from ulcerated Peyerian patches and other sources. The same abscess development is seen in the course of muscles and shows a low grade of inflammation. In the synovial sheaths of the tendons and in joints there is frequently initiated a synovitis from which, however, the infecting bacillus quickly disappears and the irritation is almost sure to quiet down, very rarely leaving fibrous ankylosis or pus, and only in the hip-joint producing mechanical trouble. Here, strangely enough, there are many cases on record of synovial distention with luxation of the femur which has remained permanent after the

convalescence which keeps the patient so long on his back that the trouble is overlooked.

The next most important and destructive deposition of bacillus colonies is in the laryngeal cartilages. Study of this shows that in the later weeks of convalescence there is, not rarely, a tumefaction of the internal laryngeal mucous membrane from abscess, due to destructive necrosis of the cricoid cartilage or of the arytenoids. The other cartilages are very much less likely to be affected. The complication is extremely dangerous and fatal from suffocative action in over 75 per cent. of the cases not operated upon; in those in which tracheotomy has been done, even including extreme cases, the mortality has been reduced to about 50 per cent.

It is only too often demonstrated that, when hoarseness and beginning obstruction are noticed, the rapidity of the edema is so marked that tracheotomy is a matter of emergency. The quick consideration of the importance of hoarseness in this fever and the safeguarding of the patient by tracheotomy is to be borne in mind.

One of the most common and distressing complications of typhoid is femoral phlebitis. While this is not rare in any septic infection, it is not uncommon for it to be followed in succeeding years by large varicose veins which become a surgical charge. Indeed, it has been frequently of so severe a grade that blockade of the iliacs and gangrene of the leg have often been seen. This latter mishap has also been many times demonstrated to follow endarteritis of the popliteal, tibial and femoral in typhoid fever.

There may be no demonstrable determining factor in causing a deposition of colonies of migrating bacilli, but the probability is that the sluggish current of blood in the lower extremities allows their growth without other cause. It has been shown that the endarteritis is equally seen in the right or left foot, producing gangrene, while the phlebitis of typhoid attacks the left femoral vein four times as often as the right. This is explained by Keen by the anatomical fact of the left common iliac vein passing below the right common iliac artery and thus receiving unequal pressure. Though these extreme varicosities of the left superficial veins even extend to the femoral and pubic, they can be safely and permanently relieved by operation without endangering the life of the foot, as I have had occasion to demonstrate.

As in other septic affections, we see parotitis not infrequently in typhoid; indeed the sympathy between the parotid gland and ulcerative lesions of the abdominal viscera was noted thirty years ago by Paget, and one must regard it as a conspicuous target for many forms of septic infection. In most cases it subsides without surgical treatment, and, for fear of the easily produced parotid fistula, I think the indurated parotid swellings suspected of harboring pus should never be incised until pus has been demonstrated by time or aspiration.

We come now to speak of the most interesting

phase of typhoid surgery, peritonitis from perforating ulcers of the intestine.

Before we consider that, however, I cannot forbear noting the frequent call for consultation to differentiate between appendicitis in its milder forms and the early pain in the appendical region in typhoid. Undoubtedly the two closely resemble each other, but a waiting policy clears all doubt away, and as the dictum of a few years ago, that "the time to operate on appendicitis is when you recognize it," has passed, the mild symptoms do not call up profound anxiety as of old.

Perforation of the intestine in typhoid always takes place in the area of the ulcerated Peyerian patch and invades the peritoneal coat not oftener than once in a hundred cases. It is of the utmost interest and importance to know whether preliminary symptoms of extreme ulceration ever show in a tender point a local crepitus. If so, one might anticipate disastrous perforation by ice application and opium. From cases I have seen in both typhoid and gastric ulcer, in which a fine crepitus of limited area coincident with a point of tenderness were recovered from, I have in my mind no question that impending perforation may be cured by Nature, but this is difficult to demonstrate.

Having had occasion to operate for peritonitis after perforating typhoid ulcers in five patients, it is of interest to draw the picture of the surface of the bowel, as it appears at operation—for few who simply treat the medical case as such can realize it. When the intestine which harbors the diseased patches which have not ulcerated is passed between the fingers, the general thickness of the gut is not exaggerated, nor is its peritoneal surface inflamed or highly congested except when suppurative peritonitis has been set up; but the patch itself can be felt thickened. In some cases several patches near the one which had perforated were covered by a blanket of greenish lymph—nearly corresponding to the area of the Peyerian patch—while the neighboring surface was simply inflamed and smeared with foul fluid. Between the coils were scanty flakes of exudate and free yellow fluid as in any septic peritonitis—with the further appearance of yellow typhoid stool and gas. The gas which continually escaped from the moment of perforation distributed itself among the bowels, but did not separate the liver from the costal pleura. This was conclusively shown in one case; yet I have seen free gas in the peritoneum when ulcer of the stomach or of the duodenum had perforated, which did separate the liver from the ribs so that the hand could be laid flat in the space. The presence of the apron of omentum accounts for this difference, which I have not heretofore seen noted.

After perforation has existed some hours there will be found one or two pints of yellow fluid in the pelvis and lumbar fossæ. The opening in the small bowel will always be seen to be in the center of a gangrenous patch within fifteen or twenty inches of the caput coli, so that it can be

quickly found. On an average it is large enough to admit the end of a lead pencil, and at every peristaltic movement, or in handling, gas and yellow fluid bubble out. Thus we have a picture of what has been going on from the moment of perforation to the moment of operation. If, now, we can imagine that at the first a slight leakage occurs, instead of a sudden explosive discharge of gas and fluid, it is entirely conceivable that a speedy exudate would be thrown about the spot and the abscess would be walled in. There is little doubt that this has happened, as Fitz has shown in a very small number of cases which seem to have shown the history of perforation and made spontaneous recovery. We feel that if such slow beginning were recognizable, it would be possible to help Nature by administering quickly sufficient morphine to paralyze all peristaltic action, keeping the patient absolutely quiet and applying ice over the lower abdomen. This is consistent with the best treatment of peritonitis from appendix perforation, which has been well epitomized by Ochsner, when he says that almost all acute attacks can be controlled by "ice, opium and starvation" for three days. But unfortunately explosion is more common than leakage in typhoid perforation, and hence acute tearing pain is the first evidence of trouble.

The pain comes usually in the third or fourth week, when the disease is running a comfortable course or convalescence has begun. Shock followed by a temperature of 105° or 106° F. supervenes, and rapid increase in leucocytosis is seen. In spite of the depleted condition of the patient, Nature makes a heroic effort to overcome the new trouble, and we see almost as good a quality of reparative lymph in the abdominal peritoneum as in cases of corresponding gravity, stricken down in otherwise fine health from other intra-abdominal injury.

Statistics show that most recoveries from operation for perforation have come from delaying until shock has passed, and twelve hours after is regarded as the most favorable period. If operation can be done under favorable circumstances within twelve to eighteen hours the recoveries rise to 32 per cent. and fall again to 13 per cent. for operation after twenty-four hours.

The operative care of perforative peritonitis is now laid out on such well defined lines that I need not mention it here. One addition has been made to the surgery of the subject by Finney's suggestion that at the earliest suspicion a competent surgeon should be requested to make a small exploratory opening of the abdomen under cocaine anesthesia, which is harmless to the patient, if nothing serious is found, and is the only infallible way of knowing if extravasation has occurred. If this principle of action be carried out in all our hospitals—as it may easily be—we shall soon add greatly to creditable reports.

My own five cases show one recovery. Two were in soldiers of the Spanish War, half moribund with typhomalarial infection when the perforation occurred; both died. The other would have been, I think, a typically good patient,

taken in the third week with violent pain and vomiting. In an hour and a half his temperature was 106° F. The patient was out of town and perforation was suspected, but I was not summoned until more than twenty-four hours had passed. Operation was done twenty-seven hours after perforation, but a big opening fifteen inches from the colon was found and liberal extravasation had occurred. A dozen oval areas of greenish protective lymph marked the site of inflamed patches, but one had become gangrenous and given way. Quick and thorough operation was tried, though he had an almost hopeless aspect when it was done. The opening in the bowel was stitched in the wound with a tube held in by a pursestring suture inverting the opening about it, so as to drain off gas and fluid from the distended and paralyzed intestine; but the patient had already been so far infected that he lived less than a day after operation. The fifth case was a duplicate of this in an exhausted patient. Operation was done thirteen hours after perforation. The latter was enlarged and anastomosed with sutures to a nearby portion of bowel. The anastomosis worked well, but the patient was too exhausted by typhoid and survived only three days.

The brief time allotted in which to speak of the physical aspects of this disease has prevented my touching on many other complications; but enough has been said to stimulate every man to be alert to these possibilities and to emphasize the pleasant assurance that surgery is coping with the most desperate of them when a timely union of medical and surgical forces is permitted.

13 West 50 Street.

THE DETECTION OF TYPHOID BACILLI IN THE FECES AS A DIAGNOSTIC TEST OF TYPHOID FEVER, AND A COMPARISON OF THIS TEST WITH THE WIDAL REACTION.¹

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WHILE most cases of typhoid fever can be diagnosed sooner or later by clinical symptoms alone, it is nevertheless a fact that in many instances purely clinical observations do not lead to a diagnosis until valuable time has been lost both in the institution of the treatment and in the sanitation of this disease. The value of the Widal test has of late considerably fallen in general estimation. This I believe to be due to the indiscriminate application of this test to both typical and atypical forms of typhoid fever and, furthermore, to the faulty technic frequently employed in making the test. Since due consideration has been given the later phase of the subject in a recent communication (MEDICAL NEWS, Jan. 11, 1902) it is not my intention to further discuss it here.

Nearly two years ago I began a series of ob-

¹ A Study from the Department of Pathology of the College of Physicians and Surgeons, Columbia University, New York.

servations in order to ascertain the frequency with which the *Bacillus typhosus* could be isolated from the feces of typhoid patients and to determine the value of such isolation tests in the routine diagnosis of the disease. In order to confirm the clinical diagnosis and for purposes of comparison Widal tests were also carried out in nearly every case. Only those cases are here reported in which I had the opportunity of personally observing the patient until the termination of the disease or until the diagnosis of typhoid fever was positively made.

Technic.—In the Widal tests fresh fluid blood serum was used, the requisite dilutions being made with a capillary pipette.

The method used in isolating typhoid bacilli from the feces was that recommended by Hiss (*Jour. Exper. Medicine*, 1897, Vol. II., No. 6). This method involves the use of a "plating" medium, in which an emulsion of the feces is "plated" in the regulation manner, and of a "tube" medium into which "stab" inoculations are made from the colonies developing in the plating medium after from twelve to eighteen hours' growth at 37° C. If typhoid bacilli be present they develop in the plating medium into characteristic thread-forming colonies which can be readily differentiated from the colonies formed by other bacteria found in feces, such as colon bacilli, etc. In the tube medium typhoid bacilli give rise to a uniform cloudiness without the production of gas, while colon and allied bacilli do not cloud the medium uniformly but always give rise to gas. The typhoid bacilli are therefore isolated by means of the plating medium and further identified by means of the tube medium. In the later portion of this work the original plating medium recommended by Hiss was replaced by another which has recently been devised by Dr. Hiss and which was personally communicated to me by him and thoroughly tested in my routine diagnostic work. This medium is composed of agar, 15 grams, gelatin, 15 grams, sodium chloride, 5 grams, glucose, 10 grams, and water, 1,000 cubic centimeters. The results obtained by the use of this new medium fully equal, if indeed they do not exceed, those given by the original medium. It is certain that it favors the development of a larger number of colonies than does the old medium and thus renders the detection of typhoid bacilli more probable when they are present in small numbers in the feces. Furthermore, its preparation is very simple, no titration or correction of reaction being necessary. In addition to the characteristic reactions given by the bacilli in the Hiss plating and tube media, every typhoid bacillus so isolated was further tested to determine its agglutinating capability.

Epitome of Cases.

Case I.—W. H., aged fourteen years. The prodromal history was characteristic of typhoid fever. No epistaxis. The case was first seen on what was probably the third clinical day. Evening temperature 101.3° F.; pulse 92. Widal re-

action negative. An endeavor to isolate the typhoid bacillus¹ from the feces taken on the following (the fourth) day was unsuccessful. No further Widal or "isolation tests" were attempted until the eighth day of the disease, when, with the Widal reaction still negative, typhoid bacilli were isolated from the feces. Very few typical colonies were seen in the plating medium. The characteristic typhoid roseola appeared on the ninth clinical day. Widal reaction on tenth clinical day negative. No Widal attempted on eleventh clinical day. Widal reaction (1-20) positive on twelfth clinical day. Typhoid bacilli were never isolated from the urine, although attempts were made on the eighteenth, twenty-fourth, twenty-sixth and thirty-sixth clinical days.

Case II.—M. B., aged eighteen years. Typical prodromal history of typhoid fever. First seen on what was probably the eighth clinical day. Evening temperature 103.1° F.; pulse 101. Widal reaction (1-30) positive. "Isolation test" negative. Daily "isolation test" negative until the twelfth clinical day, when typhoid bacilli were found in large numbers. No characteristic typhoid eruption was ever observed. Typhoid bacilli were never isolated from the urine, although attempts were made on the twenty-fifth, thirtieth and forty-first clinical days.

Case III.—A. W., aged twenty-seven years. No prodromal history. Onset sudden. First seen on what was probably the third clinical day. Evening temperature 103.4° F.; pulse 109. Chill during the afternoon. Widal reaction and "isolation test" on the fourth clinical day; both negative. No Widal or "isolation tests" until the tenth clinical day, when the Widal test (1-50) was positive, but the "isolation test" still negative. Characteristic typhoid eruption was never observed. Typhoid bacilli were never isolated from the feces, although attempts were made on the twelfth, eighteenth, twenty-sixth and thirty-fourth clinical days. Typhoid bacilli were never obtained from the urine, although attempts were made on the twenty-sixth and thirty-fourth clinical days. The disease ran a typical typhoid course and the reaction persisted (1-50) into convalescence.

Case IV.—C. H., aged twenty years. Indefinite prodromal typhoid history. No epistaxis. First seen on what was probably the eighth clinical day. Morning temperature 101.2° F.; pulse 89. Widal reaction negative. "Isolation test" positive. Many typical colonies were seen in the plating medium. Characteristic typhoid eruption appeared on the ninth clinical day. A positive Widal reaction was never obtained, although attempts were made on the tenth, sixteenth, twenty-first, twenty-ninth and thirty-seventh clinical days. The first attempt to obtain typhoid bacilli from the urine was made on the twenty-fifth clinical day. It was successful. Urine contained albumin and hyaline casts.

Case V.—A. H., aged nine years. Character-

¹ For the sake of brevity the attempts to isolate typhoid bacilli from the feces will hereafter be referred to as "isolation tests."

istic prodromal typhoid history with epistaxis. First seen on what was probably the seventh clinical day. Evening temperature 102° F.; pulse 97. Widal reaction and "isolation test" on eighth clinical day; both negative. Widal and "isolation test" were not attempted until the tenth clinical day, when the "isolation test" was positive and the Widal negative. Widal test next attempted on the thirteenth clinical day and found positive (1-30). Characteristic typhoid eruption was never observed. No attempt was made to isolate typhoid bacilli from the urine until the twenty-third clinical day, when the organisms were found. Urine contained albumin, but no casts.

Case VI.—C. W., aged fifteen years. Fairly characteristic prodromal typhoid history. First seen on what was probably the fourteenth clinical day. Evening temperature 104.3° F.; pulse 112. Widal reaction negative. "Isolation test" positive. Characteristic typhoid eruption had not been previously and was not subsequently observed. Further Widal tests were not attempted. No attempt was made to obtain typhoid bacilli from the urine.

Case VII.—E. M., aged twenty-two years. Characteristic prodromal typhoid history. No epistaxis. First seen on what was probably the fifth clinical day. Evening temperature 102.2° F.; pulse 100. Widal reaction and "isolation test" on sixth clinical day; both negative. Characteristic typhoid eruption appeared on the seventh clinical day. Widal reaction and "isolation test" on the seventh clinical day were still negative. "Isolation test" was next tried on tenth clinical day; positive. Widal still negative. Widal test was next tried on twelfth clinical day; positive (1-30). Typhoid bacilli were never isolated from the urine, although attempts were made on the twenty-eighth, thirtieth, thirty-second and thirty-eighth clinical days.

Case VIII.—O. H., aged twelve years. Characteristic prodromal typhoid history. No epistaxis. First seen on what was probably the tenth clinical day. Evening temperature 103.3° F.; pulse 106. "Isolation test" positive. Widal reaction negative. Widal reaction was next tried on the twelfth clinical day; negative. Widal reaction was next tried on fifteenth clinical day; positive (1-50). Characteristic typhoid eruption was never observed. First attempt to isolate typhoid bacilli from the urine made on the fifteenth clinical day; negative. Next attempt on the twentieth clinical day; positive. Urine contained albumin and hyaline and granular casts.

Case IX.—E. S., aged nineteen years. Indefinite prodromal typhoid history. No epistaxis. First seen on what was probably the seventh clinical day. Evening temperature 103° F.; pulse 89. Widal reaction (1-10) positive. "Isolation test" negative. Characteristic typhoid eruption appeared on the ninth clinical day. "Isolation test" was next tried on the fourteenth clinical day; positive. Typhoid bacilli were never obtained from the urine, although attempts were

made on the twenty-first and thirty-first clinical days.

Case X.—F. W., aged eighteen years. Indefinite prodromal typhoid history. No epistaxis. First seen on what was probably the twelfth clinical day. Evening temperature 103.5° F.; pulse 110. Widal reaction negative. "Isolation test" positive. Widal reaction was next tried on the nineteenth clinical day; positive (1-20). Characteristic typhoid eruption was never observed. First attempt to isolate typhoid bacilli from urine was made on thirty-third clinical day; positive. Urine contained albumin and hyaline casts.

Case XI.—H. A., aged twenty-five years. Characteristic prodromal typhoid history with epistaxis. First seen on what was probably the eighteenth clinical day. Evening temperature 104.1° F.; pulse 112. Widal reaction (1-50) positive. "Isolation test" negative. "Isolation test" was tried on the twenty-first clinical day; positive. Characteristic typhoid eruption was never observed. No attempt was made to isolate typhoid bacilli from the urine.

Case XII.—D. M., aged six years. Indefinite prodromal typhoid history. No epistaxis. First seen on what was probably the seventh clinical day. Evening temperature 104.3° F.; pulse 125. Widal reaction and "isolation test" negative. Characteristic typhoid eruption appeared on the eighth clinical day. Widal reaction was next tried on the twelfth clinical day; positive (1-30). "Isolation test" still negative. "Isolation test" was next tried on the fourteenth clinical day; positive. First attempt to isolate typhoid bacilli from the urine was on the twenty-second clinical day; result, positive. Urine contained albumin, but no casts.

Case XIII.—J. B., aged thirty-four years. Characteristic prodromal typhoid history. No epistaxis. First seen on what was probably the tenth clinical day. Evening temperature 103.3° F.; pulse 102. Widal reaction (1-20) positive. "Isolation test" negative, but positive on the next (the eleventh) day. No typhoid bacilli were ever obtained although attempts were made on the eighteenth and twenty-eighth clinical days.

Case XIV.—W. F., aged twelve years. Characteristic prodromal typhoid history. No epistaxis. First seen on what was probably the seventh clinical day. Evening temperature 102.6° F.; pulse 101. Widal reaction and "isolation test" both negative. "Isolation test" positive on the following (the eighth) day. Widal reaction still negative. Widal reaction was next tried on the twelfth clinical day; positive (1-30). Characteristic typhoid eruption appeared on the ninth clinical day. Typhoid bacilli were never isolated from the urine, although attempts were made on the twentieth, twenty-seventh, thirty-seventh and forty-seventh clinical days.

Case XV.—B. A., aged twenty-two years. Indefinite prodromal typhoid history. No epistaxis. First seen on what was probably the seventeenth clinical day. Evening temperature 105° F.; pulse 110. Widal reaction negative. "Isolation

test" positive. Characteristic typhoid eruption was never observed. Further Widal tests were not made. Attempts were not made to obtain typhoid bacilli from the urine.

Case XVI.—H. B., aged eighteen years. Indefinite prodromal typhoid history. No epistaxis. First seen on what was probably the fifth clinical day. Evening temperature 102.8° F.; pulse 89. Widal reaction and "isolation test" negative. Widal reaction was next tried on the seventh clinical day; positive (1-50). "Isolation test" still negative. "Isolation test" was next tried on the twelfth clinical day; positive. Characteristic typhoid eruption appeared on the tenth clinical day. Typhoid bacilli were never obtained from the urine, although attempts were made on the twentieth and twenty-eighth clinical days.

Case XVII.—C. M., aged fourteen years. Fairly characteristic prodromal typhoid history. No epistaxis. First seen on what was probably the seventh clinical day. Evening temperature 102.3° F.; pulse 99. Widal reaction and "isolation test" negative. Characteristic typhoid eruption appeared on the following (the eighth) day. "Isolation test" was next tried on the eleventh clinical day; positive. Widal reaction still negative. Widal reaction was next tried on the sixteenth clinical day; positive (1-20). Typhoid bacilli were never obtained from the urine, although attempts were made on the twenty-fifth and thirty-fifth clinical days.

Case XVIII.—P. F., aged twenty-nine years. Indefinite prodromal typhoid history. No epistaxis. First seen on what was probably the seventeenth clinical day. Evening temperature 105.2° F.; pulse 114. Widal reaction (1-50) positive. "Isolation test" positive. Characteristic typhoid eruption was never observed. Attempts to isolate typhoid bacilli from the urine were made on the twentieth and twenty-sixth clinical days. First attempt negative; second positive. Urine contained albumin, but no casts.

Case XIX.—S. R., aged ten years. No prodromal history. Onset sudden. First seen on what was probably the fifth clinical day. Evening temperature 101.2° F.; pulse 104. Widal reaction and "isolation test" both negative. "Isolation test" was next tried on the eighth clinical day; positive. Widal reaction still negative. Characteristic typhoid eruption appeared on the ninth clinical day. Widal reaction was next tried on the twelfth clinical day; positive (1-50). First attempt to isolate typhoid bacilli from the urine was made on the nineteenth clinical day. Result, positive. Urine contained albumin and hyaline casts.

Case XX.—O. W., aged eighteen years. Indefinite prodromal typhoid history. No epistaxis. First seen on what was probably the seventh clinical day. Evening temperature 102.3° F.; pulse 95. Widal reaction and "isolation test" negative. "Isolation test" positive on the following (the eighth) day. Widal reaction negative. Widal reaction still negative on the twelfth clinical day. Widal reaction was next tried on the fourteenth

clinical day; positive (1-20). Characteristic typhoid eruption appeared on eighth clinical day. Typhoid bacilli were never obtained from the urine, although attempts were made on the twentieth and thirty-fifth clinical days.

Case XXI.—D. P., aged seven years. Fairly characteristic prodromal typhoid history. No epistaxis. First seen on what was probably the fifth clinical day. Evening temperature 101.3° F.; pulse 108. Widal reaction and "isolation test" negative. "Isolation test" positive on the following (the sixth) clinical day. Widal reaction negative. Widal reaction was next tried on the eighth clinical day; positive (1-50). Characteristic typhoid eruption was never observed. A complicating measles developed on the ninth clinical day. First attempt to isolate typhoid bacilli from the urine was made on the thirty-second clinical day. Result, positive. Urine contained albumin and hyaline casts. [This case will be subsequently reported in detail.]

Summary.—A review of these twenty-one cases shows that typhoid bacilli were isolated from the feces in twenty, while a positive Widal was obtained in only eighteen.

In making a comparison of the diagnostic value of the "isolation test" and the Widal reaction it is necessary to withdraw from consideration certain of these cases. Case XVIII. should be withdrawn entirely because it was not seen sufficiently early to test the value of either procedure. In considering the "isolation test" Case XV. should be withdrawn for the same reason. In considering the Widal reaction Cases VI. and XV. should be withdrawn, since only one Widal test was made in each; Case X. because the interval between the first and second attempts to obtain this reaction was too long; also Case XI. because it was not seen sufficiently early in the course of the disease.

With these cases eliminated we find that in eighteen cases in which the "isolation test" was successful the average day of isolation was the tenth, while in fifteen cases in which a positive Widal reaction was elicited the average day of its first appearance was the twelfth.

Comparing these procedures from another standpoint we find that in seventeen cases typhoid bacilli were isolated from the feces during the second week of the disease, while in only twelve was a positive Widal obtained before the fourteenth day.

If we compare them from still another and final point of view we find that the earliest day of successful isolation was the sixth and the latest the twenty-first (leaving out of consideration Case XV.), while the earliest appearance of a positive Widal was on the sixth day and its latest primary appearance on the eighteenth day.

It is furthermore apparent from a study of these cases that both of these procedures, when used in combination, make possible the establishment of a diagnosis of typhoid fever in many instances before this could be accomplished by purely clinical observations. In only three, Cases

VII., XII., and XVII., of the twenty-one did the appearance of the characteristic typhoid eruption render the diagnosis positive before it had been established by one of these methods.

In eighteen of the cases attempts were made to isolate typhoid bacilli from the urine. In eight this was accomplished. The earliest day of such isolation was the nineteenth and the latest the thirty-third. In every case in which the bacilli were so obtained albumin was present in the urine.

Conclusions.

1. During the second week of typhoid fever, when technical aids are of the greatest value to the practitioner, isolation of typhoid bacilli from the feces gives slightly better results than does the Widal test. These two methods used in combination, when the tests are carefully and persistently made, render material aid in the diagnosis of this disease previous to the appearance of distinctive clinical symptoms.

2. By the use of the Hiss isolation method, especially with the substitution of the new plating medium, the detection and isolation of typhoid bacilli are, to one familiar with bacteriological methods, simple, reliable and practical.

In conclusion it gives me pleasure to express my obligation to Prof. T. Mitchell Prudden and Dr. Philip Hanson Hiss, Jr., for assistance and suggestions during this work.

REMARKS UPON SOME EXPERIENCES WITH THE WIDAL REACTION.¹

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In the remarks which I am about to make in response to your very kind invitation, I shall confine myself almost entirely to my personal experience in performing the Widal tests for the various services of the Mount Sinai Hospital from March 1, 1898, to October 15, 1901. These tests, 3,514 in all, made by myself or by the members of the house-staff under my supervision, were all carried out according to the same method. It was always my good fortune to be kept well informed upon the clinical aspects of the cases through the kindness of the successive house-physicians. The uniformity of the work makes the series a valuable one and will, I hope, afford me the opportunity of bringing out some points of interest, although I am well aware that I shall deal mainly with facts that are a part of our general knowledge.

The method used by me admits of quite accurate dilution. It has been detailed in an article in the Mount Sinai Hospital Reports, Volume I., and I shall therefore not describe it fully here. Certain data will, however, be of interest.

Dried blood was used for all our tests, except as mentioned later. The blood was always used within four hours after it had been obtained, often directly after it had dried. It is distinctively

disadvantageous to use the blood before it has dried, because the corpuscles interfere with the clearness of the reaction. If the blood is allowed to stand too long before being utilized, for instance, over night, the results are not entirely satisfactory.

The cultures of the typhoid bacillus were prepared as follows: A stock culture on agar was kept from which daily inoculations into bouillon were made. The agar culture is inoculated about every three weeks upon serum-glucose-agar.¹ From this it is inoculated upon agar. The growth on the serum-glucose-agar is often not very marked, but after re-inoculation on the agar-tube a very profuse active growth is obtained. By the use of this method the organism has been kept growing very vigorously for over two years. A potato-tube can be used instead of the serum medium, but the results are not as uniform nor as good.

The bouillon used had an acidity varying from 1 to 1.5 per cent. (phenolphthalein used in titrations). We have usually obtained better growths when Merck's peptone was used in making the medium than when Witte's peptone was employed. As a rule 1 per cent. peptone was used. The bouillon cultures were incubated at a temperature of 32°-35° C. In summer they were not put into the thermostat. The temperature of 35° C. is more favorable than 37° C., because the bacilli are much more motile at that temperature, and we have obtained the best results with the most active organisms. On this point observers have differed very much. The bouillon cultures are used about eighteen to twenty-four hours after inoculation. We have generally used a dilution of 1 to 20. If the reaction proved positive with this dilution in cases that were not typical instances of typhoid fever, the reaction was repeated in a dilution of 1 to 50. The later reactions were all positive.

In some instances in which the cases presented none of the usual symptoms of typhoid fever, except the febrile state, we succeeded in obtaining reactions in dilutions of 1 to 200 or 1 to 300. Such instances will be cited later. The reactions were viewed directly after being made and a large number were immediately positive. The cultures were then allowed to stand twenty minutes on the laboratory table and again examined. No longer time limit was used. We have been very particular in regard to diagnosing positive reactions. We considered a reaction positive when all motility had ceased and when the bacteria were gathered into clumps. A few non-motile bacteria between the clumps do not deter us from calling a reaction positive, nor would one or two motile bacteria in the field.

The process of clumping has been so often described that it is unnecessary to go into the details here. It must be noted, however, that the clumps are very characteristic, and, after a little practice, should not be confounded with clumps that are not due to the specific action of the blood.

¹ Read by invitation before the German Medical Society, November 4, 1901.

¹ For mode of preparation see Libman, Journal of Medical Research, Volume I.

The clump looks like a network, the individual bacilli being distinct; some look bright and some dark. Often all the bacilli in the clump may move and even the whole clump may appear to do so, but so long as there are only a few bacilli between the clumps, and these few are not motile, the reaction must be considered positive.

Since 1899 we have reported only positive reactions, everything else being called negative. It is very risky to speak of "partial reactions" or "suspicious reactions" or "incomplete reactions," etc. These so-called "partial reactions" occur in many diseases. We have noted them often in cases of tuberculosis, and particularly in generalized tuberculosis, the very condition most difficult to differentiate from typhoid fever. I came near having a sad experience in such a case in 1898. A man was admitted to the service of Dr. Manges with a history of headache, constipation, malaise and fever. After arriving at the hospital his fever gradually rose, as it does in typhoid fever, and he developed a roseola on the abdomen. The spleen was enlarged to percussion, but not felt. On several occasions I reported the Widal reaction as being partial. At times I was inclined to call it positive, but the clumps were always indistinct and there were rather too many non-motile bacilli between. A week after admission he developed ptosis and internal strabismus of the right eye and the further course was typical of tuberculous meningitis. The lumbar puncture fluid when inoculated into a guinea-pig caused marked tuberculous lesions, and the post-mortem examination of the case revealed a general military tuberculosis.

The reactions in our cases were made every day until a positive reaction was obtained, or until it was made evident that the given case was not one of typhoid fever. When the reaction was persistently negative in a case strongly suspected of being typhoid fever, tests were made with serum obtained by raising a blister. The latter tests were all negative. Most observers, however, have found that serum gives about 10 per cent. more positive reactions than does the dried blood.

Altogether 3,514 tests were made in 860 cases. Of these 334 were cases of typhoid fever. They are distributed as follows: 1898, 233 cases, 855 tests; 1899, 185 cases, 1,030 tests; 1900, 242 cases, 922 tests; 1901, 200 cases, 707 tests.

It will be noted that in 1899 more tests were made and fewer cases examined than in any other year. This was not a matter of chance. It was due to the fact that during most of that year the cultures were incubated at too high a temperature, and we had to test oftener till we obtained positive reactions. In compiling some of the statistics, I have therefore omitted the data belonging to that year.

The results in the cases of typhoid were as follows: 1898, 98 cases positive, 5 negative; 1899, 61 cases positive, 9 negative; 1900, 104 cases positive, 4 negative; 1901, 69 cases positive, 3 negative; total, 334 cases positive, 21 negative.

In percentages the figures are: 1898, 5.1 per

cent. negative; 1899, 12.8 per cent. negative; 1900, 3.7 per cent. negative; 1901, 4.16 per cent. negative; total, 5.9 per cent. negative.

The reason for the high figure in 1899 has been given. The totals for 1900 and 1901 give a more reliable figure as they were nearly always made with cultures incubated at 35° C. They include 173 positive cases and 7 negative—in other words, 3.9 per cent. of the cases never gave a positive reaction.

These results agree pretty well with those given by most authors. Thus, Cabot¹ has collected 5,978 cases, 2.8 per cent. of which never gave a reaction, and Kneass and Stengel² give a negative percentage of 4.8 per cent. These figures cannot be considered accurate, as they represent the statistics given by a large number of workers using different methods and varying decidedly in their ideas of what constitutes a positive reaction. However, to the practitioner it makes no difference whether 1 per cent. or 10 per cent. of typhoid fever cases give no reaction, because, no matter how few fail to give a reaction, any case he meets may be one of those that never respond to the test.

In the 526 cases that were not instances of typhoid fever we never obtained a positive reaction, although the blood of these patients was in many instances repeatedly examined. These cases included all the usual forms of febrile disease. Most writers report instances of the occurrence of a positive Widal reaction in other diseases than typhoid fever. Cabot's collected statistics give 5 per cent. in 5,668 cases, and in 113 cases the blood was examined only once. Kneass and Stengel put the figure at 2 per cent. We are inclined to ascribe many of these positive results to three causes: (1) As Cabot suggests, some were due to errors in technic or judgment. (2) Some of the cases were instances of typhoid fever which clinically resembled other diseases, and in which the observer did not properly examine the case for evidences of typhoid fever. (3) Some were due to previous attacks of typhoid fever.

In trying to give figures as to the day upon which the reaction became positive, we are met by the great difficulty of determining the first day of the disease, which is notoriously uncertain in typhoid fever. Frequently we were even dealing with a relapse, although the patient did not give the history of any previous illness.

In the following statistics I have included only those cases in which the patient gave a history of having been taken sick on a certain day. Only 263 cases could be utilized for the figures. The results for each year expressed in percentages are as follows:

	1898.	'99.	1900.	'01.
At end of first week	4.55	0	7.5	10.0 per cent. positive
At end of second week	36.0	21.0	34.0	44.7 " " "
By the 20th day	59.0	42.0	66.0	74.5 " " "
By the 30th day	88.4	92.1	77.0	96.0 " " "

The following table, which relates to those

¹Serum Diagnosis, 1896.

²American Year Book of Medicine and Surgery, 1898.

cases only in which a positive reaction occurred after the blood had failed to give a reaction affords more reliable data.

At end of first week.....	5.7 per cent. positive
At end of second week.....	36. " " "
By the 20th day.....	67. " " "
By the 30th day.....	92. " " "

The earliest reaction was one found on the third day. This was a case of typhoid fever in a boy nine years of age. The blood gave a positive reaction the first time it was examined. Probably the case was of longer duration than it was supposed to be.

The latest day on which a reaction first appeared was the sixty-seventh.

There were found positive: On the fifth day, 3 cases; on the sixth day, 2 cases; on the seventh day, 3 cases; on the eighth day, 4 cases; on the ninth day, 5 cases; on the tenth day, 5 cases; on the eleventh to fifteenth day, 36 cases.

Only one-third of the cases gave a positive reaction by the end of the second week and two-thirds by the end of the third week. This is the main disadvantage of the Widal reaction. There is, however, a brighter side to these statistics. Many cases of typhoid fever come to the physician for treatment after the illness has lasted a week or more. The important question is, therefore, how soon after the cases are seen do they give a positive reaction? We cannot answer this from data obtained in private practice. We must, therefore, have recourse to the hospital data, and it must be noted that patients arriving in a hospital have, for the most part, been suffering a longer time than those that seek aid from the family physician. The figures at my disposal show that in a series of 295 cases 50 per cent. gave a positive reaction within the first two days after admission; 80 per cent. by the end of the first week, and 90 per cent. by the end of the second week.

The data given above include a number of children varying in age from one and one-half to fourteen years.

Dr. Gershel of the house-staff has recently published an article on the value of the Widal reaction in children¹ and I shall confine myself to a few quotations from his paper.

His observations extend over 84 cases of the disease. Three of the cases never gave a positive reaction. In 115 cases of other febrile diseases a positive reaction was never found. Gershel found that the main facts concerning the reaction were the same in children as in adults, but that the reaction is of greater value in the former, because typhoid fever is more atypical in them and also more difficult of diagnosis. The reaction appeared quite early in some cases that at first presented no distinct symptoms of typhoid fever. On the whole the reaction appeared earlier than in adults. For a description of some very interesting cases of typhoid fever in children resembling pneumonia or meningitis I would refer to Gershel's paper.

¹ Medical Record, November 23, 1901.

Before giving you the conclusions to be drawn from the material I have laid before you, I shall, for the sake of completeness, rapidly cover a few points of interest concerning the reaction. The reaction, in a number of cases, first appeared during convalescence or during a first or second relapse. Sometimes a reaction would disappear and return after a few days, or during the relapse. The reaction was of no use in the prognosis, occurring late in some mild cases and early in some severe ones. This is almost the universal experience. As to the persistence of the reaction, practically no researches were made. In a number of cases, however, it was noted that it disappeared after a few days. In one case, recently observed, a reaction was obtained in a typical case on the day of admission, and not thereafter. This fact is of importance as it probably explains the absence of the reaction in some cases of typhoid fever while under observation.

Many data concerning the persistence of the reaction are given by Cabot. Some of these I shall cite. Widal found the reaction to persist for one year, at least, in 11 out of 40 cases. He also found the reaction positive in one case eight years after the disease, in one case twenty-six years, in one case nine years, in one seven years, and in one eight years. Elsberg examined the blood of six patients who had had typhoid fever one-half to ten years previously and obtained negative results. Biggs and Park found the reaction persist to a marked extent for three or four months only. On the other hand, Grünbaum claims to have found a positive reaction in a patient thirty-seven years after the attack of typhoid fever.

Although these facts force us to acknowledge that the occurrence of a positive reaction in any fever case, if the reaction be the first one made, may be attributable to a previous attack of typhoid fever, we have not encountered any trouble therefrom. Among our many cases which were clinically not typhoid, we never obtained a positive reaction even in those instances in which there was a definite previous history of typhoid fever.

Recently, a patient who had suffered from typhoid fever two years previously at the Boston City Hospital, a positive reaction being obtained at that time, was admitted with symptoms suggestive of the disease. On the day of admission no reaction was obtained. On the following day it was positive. The occurrence of the negative reaction before the positive one demonstrated conclusively that the man was again suffering from typhoid fever. However, in cases in which the reaction is positive at the first examination it is important to question the patient carefully as to the possibility of a former attack of typhoid fever, unless the clinical picture is sufficiently characteristic to dispel all doubts.

General Deductions.

1. A positive Widal reaction, according to our experience, always means that typhoid fever is or has been present.

2. Partial reactions are absolutely to be ignored.

3. A negative reaction does not exclude the existence of typhoid fever. It occurs under any of the following conditions: (a) The reaction has already disappeared; (b) the reaction may only appear later; (c) the culture may be at fault; (d) the case is clinically one of typhoid fever, and there may never be a positive reaction; (e) the disease is not typhoid fever. A negative reaction may occur if the patient is suffering from an infection by a paracolony bacillus and still, for the practitioner, the case is identical with one of typhoid fever. Again, a positive reaction may occur when the case is clinically not one of typhoid fever, and yet the autopsy, if there be one, may show the presence of the typhoid bacillus in some part of the body, or it may be found *intra vitam* in the urine, feces, rose spots, blood, or some complicating lesion.

4. Scientifically, the Widal reaction is of the greatest value in establishing the presence of infection by the typhoid organism in cases such as those last referred to and in assisting in identifying the typhoid bacillus.

Practically, it is also of great use, but it is not so valuable as we would wish it to be. Often the diagnosis of typhoid fever is very clear long before we obtain the reaction. In many cases, however, it alone can establish the diagnosis. This is particularly true of the atypical cases in which pneumonic or meningeal symptoms usher in the disease. These cases are more common in children than in adults. We have had the good fortune to obtain positive reactions quite early in many of the atypical cases. The citation of a few cases in this connection will be of interest.

Case I.—Described by Dr. Alfred Meyer in the Mount Sinai Hospital Reports, Volume I. A man, aged forty-four years, was admitted on October 1, 1898, with a history of insomnia and headache lasting one month, loss of flesh and strength. On admission he was found to talk in a rambling fashion; there was slight ptosis of the left eyelid; the tongue deviated somewhat to the right; there was an occasional tremor of the right side of the face and tongue; the voice was tremulous; marked *tache cérébrale* present; temperature 101.8° F.; pulse 126; respiration 30; physical examination negative. His temperature ran daily between 99 or 100 to 102 or 103° F. On October 7th a Widal test proved negative; temperature 99.2 to 101.2° F. On the 8th it was positive in a dilution of 1 to 50; on the 9th it was again positive. The temperature remained about the same for a number of days and then declined until it became normal on October 25th. All of the symptoms disappeared. At no time was any enlargement of the spleen or a roseola found.

Case II.—Service of Dr. Brill. A nurse suffered from fever, headache and malaise for two days. The spleen could not be distinctly felt; no roseola. After three days' stay in the hospital the temperature became normal. The case appeared to be one of auto-intoxication. The Widal

reaction was negative until two days after the temperature became normal. Three days later it was evident that the reaction had not misled us, as the patient again had fever and the next day suffered from severe pain in the splenic region, increased fever and rapid pulse. The spleen was palpable. It seemed very probable that we were dealing with a relapse accompanied by splenic infarction. The temperature and pulse remained high for a number of days, but the subsequent history is not known because the patient returned to her home while still ill.

Case III.—A girl, fifteen years of age, was admitted to the service of Dr. Manges in April, 1898, with the history of several hemorrhages from the bowel on the previous day. There was no distinct previous history. The spleen was found slightly enlarged, the temperature was normal. A Widal reaction was positive up to 1 to 100. The patient gradually recuperated and had fever for a number of days. She was discharged from the hospital, but returned about two weeks later with a relapse with typical symptoms.

Case IV.—A boy who presented symptoms of perforation of the bowels was operated upon by Dr. A. A. Berg.¹ His previous history was negative except for malaise of a few days' duration. On opening the abdomen a small perforation in the ileum was found and was sewn up. The boy had no roseola and no palpably enlarged spleen. His temperature remained moderately high for a few days only. Repeated blood examinations were made, and finally, a number of days after convalescence had been established, the reaction was found positive 1 to 100. This case occurred in the spring of the year, as did also Case III., as noted.

Case V.—A young man, eighteen years of age, was admitted with a history of two weeks' illness. He claimed to have had a chill every evening followed by fever. The spleen was very large and hard. His temperature in the hospital ranged for a few days between 100 in the morning to 103 or 104° F. at night, but he did not have any chills. There was no roseola and no plasmodia were found in the blood. Although a history and the hard spleen suggested malaria, a positive Widal reaction was found. To determine whether typhoid alone was present, or whether he might have a malarial attack at the end of a typhoid, no quinine was given. After a few days the temperature gradually fell to normal, and remained normal until he left the hospital.

Case VI.—The last case that I wish to describe is a particularly interesting one. A man of fifty years consulted me for an illness of four weeks' duration. In 1873 he had been sent to Denver for pulmonary tuberculosis from which he practically recovered. One year ago he had a hemoptysis after a slight exertion. The onset of the present illness was ascribed to taking a cold bath, which was followed by a chill. After this he coughed moderately and had a moderate amount of expectoration. He felt miserable all the time, but did not believe he had fever.

¹ Medical Record, June, 1901.

On examining the patient I found a large area of dulness at the right apex, with increased breathing, subcrepitant and coarse friction râles. The pulse was 120; the heart action poor. The spleen was enlarged to percussion and plainly felt below the free border of the ribs. It appeared to be quite soft. There was no history of malaria and no evidences of cirrhosis of the liver. I found a rectal temperature of 103° F.

Although aware of the fact that the splenic enlargement might be ascribed to a prolonged fever due to the pulmonary condition, I considered two other possibilities; first, that he was suffering from pulmonary tuberculosis *plus* typhoid fever; second, that I was dealing with a case of ambulatory typhoid fever and that the pulmonary signs represented an old, quiescent lesion. The first Widal reaction was negative; the second positive in a dilution of 1 to 100. No tubercle bacilli were found in the sputum. His temperature came down by lysis, taking eight days to reach the normal point. The splenic enlargement disappeared two days after I first saw him. There then appeared two suspicious spots on the back. The temperature remained normal for three weeks, when he had an attack of biliary colic followed by jaundice which still persists.

The final question is, When should the Widal test be made? In hospital work circumstances are such that the reaction can easily be made daily. In private practice this is hardly feasible. It is advisable, however, to test the blood for the reaction early in any fever case the diagnosis of which is in doubt. If the result be negative, as it is apt to be, a later positive reaction stamps the case as one of typhoid fever, and the reaction cannot be attributed to an earlier attack of the disease.

If a case present the classical symptoms of typhoid fever, it is not necessary to examine the blood, except possibly for two reasons: (1) If later in the course of the disease some perplexing symptom-complex arise, one can be sure that the original diagnosis was correct; (2) if some unusual observation is made, the case can be utilized for the purpose of advancing our knowledge of typhoid fever.

If the case be a doubtful one, the reaction should be made every two days until it becomes positive, or until in other ways a positive diagnosis of the condition has been established by the practitioner.

SOME OBSERVATIONS IN TYPHOID FEVER.¹

BY FRANK SHERMAN MEARA, PH.B., M.D.,
OF NEW YORK.

I HAVE no desire to play the rival of the text-book nor do I wish to exercise overmuch my ingenuity at compilation, an art carried to no small degree of perfection, as analyses of addresses on such occasions and of contributions to an already redundant medical literature will demonstrate; but my purpose is, in the rôle of a

humble practitioner, to set before you a few observations drawn from a class of cases the frequency of which makes you all interested participants and should provoke a fertile discussion based on your own experience; I refer to typhoid fever.

So ubiquitous is this disease that it commands universal attention, and so protean are its manifestations that were one conversant with all its bibliography, one, too, might be shunned as carrying the whole Bodleian library in his head. In all standard text-books and systems its description, measured quantitatively, dwarfs that of any other disease. Voluminous monographs have been devoted to it; tomes of no mean bulk have considered its complications, medical and surgical; treatises have been written on its bacteriology; endless articles have been devoted to its treatment, to say nothing of clinical reports, statistical analyses, and hygienic considerations, until even Shakespeariana seem put to shame beside it; and all this is fortunate, for few subjects are worthy of more careful treatment.

Fresh from the medical school and not yet with a hospital training I met my first case of typhoid fever in a country practice and—must I confess it?—promptly diagnosed it as malaria and treated it as such until, as the days wore on, the probability of the case dawned on me. The history was briefly as follows:

A youth, eighteen years of age, sent for me because he felt some malaise and appreciated the fact that he had some fever. He reported that he had taken cold three days before. His temperature for 103.8° F.; pulse, 80, and dicrotic. The physical examination was negative except for a reduplication of the second sound of the heart. His temperature gradually fell, showing a variation of about one degree between morning and evening for three weeks. All this time his pulse varied but little from normal, he was perfectly comfortable, but so drowsy as to be uncomplaining of his detention in bed. His appetite was excellent. The spleen could not be felt nor were spots seen at any time. An examination for plasmodia malariae could not be made under the circumstances and the Widal test had not yet come into vogue. The continued temperature, not yielding to quinine, the slow, dicrotic pulse, the drowsy, comfortable condition of the patient and the absence of any obvious lesion responsible for the temperature leave no doubt of the diagnosis. How far this picture departed from the text-book type it is needless to remind you. I deem myself fortunate in having met this aberrant form thus early in my medical career, as it impressed on me the necessity of going outside of the types for diagnosis.

I had fallen into the most common error of diagnosis (in company, I grant you, not to be proud of) as the following statements will show. Thayer, in his "Lectures on Malarial Fevers," says: "It is a melancholy truth that a large body of medical men in this country have scarcely

¹ Read before the Riverside Practitioners' Society.

passed beyond the limits reached by Hippocrates in their clinical appreciation of the continued fevers." He shows from statistics that during six years preceding 1890 there were reported from New York city 2,060 deaths from malaria, 2,031 from typhoid; from Brooklyn 1,413 deaths from malaria, 1,002 from typhoid; from Baltimore 934 from malaria; 904 from typhoid, and shows that during this time in the Johns Hopkins Hospital there were forty-eight deaths from typhoid and only three from malaria. With these data, considering the mild type of malaria in the North, it is not difficult to appreciate the enormity of these errors in diagnosis.

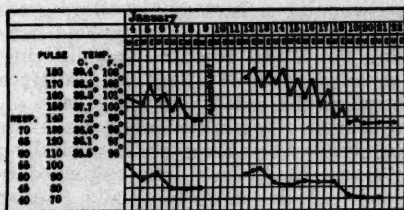
The report of Dr. Victor C. Vaughan, a member of a board appointed by Surgeon-General Sternberg for the study of the cause and spread of typhoid among the troops during the war with Spain, affords interesting reading in this connection. The troops in the various camps were represented by medical men from widely-distributed localities and yet there was a striking unanimity in error. At Camp Alger they found most of the febrile cases diagnosed as malaria and yet hundreds of blood examinations which they instituted did not reveal one plasmodium. Their work among the numerous camps led them to the conclusion that "malaria was a very rare disease among those troops that remained in the United States." Among the twelve regiments of the first and third army corps there were 3,732 probable cases of typhoid, of which 1,584 were recognized by the army surgeons. In the early stages of these mild types a diagnosis can not be made off hand. Repeated examinations of the blood for the plasmodium and for the Widal reaction must be made to differentiate.

I was called in the summer of 1899 to see a physician who for ten days had had a mild type of fever which he himself considered malarial, but which was suspiciously resistant to quinine. When I saw him the morning temperature was 99.8° F., and the pulse 84. He had no rose spots and the spleen was not palpable. I carefully examined the blood for plasmodia, but without result. The diagnosis of malaria at first was fortified in his own mind by the fact that he came from New Jersey, though he was too shrewd a man to give much weight to the quondam Sherlock Holmes method of diagnosis of malaria from the character of the mud upon the patient's shoes. Time settled the diagnosis and he developed the signs of a mild typhoid which ran an uneventful course.

Another form of diagnosis that has come within my ken is typhomalaria. Some time ago I was called to a nearby city, to see a case in which this diagnosis had been made. The patient was a girl, fifteen years of age, who had returned two weeks before from Detroit with a fever which showed considerable excursion from morning to night. Her subjective symptoms were a chill five days before arriving home, fever, drowsiness and malaise. The diagnosis

of malaria had been made and goodly quantities of quinine administered. In spite of this fact the temperature kept on the increase for ten days to two weeks and then began to abate a little. The patient was hungry and desired to sit up in bed; this she was allowed to do with the result that she had an intestinal hemorrhage. The next morning rose-colored spots were abundant and were noticed for the first time. The diagnosis was then changed to typhomalaria. I saw her on this day. It is needless to go into detail; I found a typical typhoid; spots, spleen, hemorrhage, temperature curve, all bespeaking the condition. No blood examination had been made.

A word about typhomalaria; if it mean anything, it means a mixed infection. How rare this mixed infection is can be appreciated by a perusal of Lyon's article in the Johns Hopkins Hospital Reports.¹ He was able to collect thirty cases which met the criteria demanded by scientific diagnosis. The significance of the term as usually employed is defined by a quotation from this article: "The term typhomalarial fever, as Woodward later pathetically remarked, has been used extensively by many physicians to denote any obscure febrile affection which offered diagnostic difficulty." Woodward introduced the term into the United States; hence the pathos. The difficulty in diagnosis in these light cases can scarcely be better illustrated than by the following: The patient, a man, twenty-eight years



of age, called me to attend him January 4, 1898, complaining of an attack of diarrhea which had lasted three days. He said he had frequently had such attacks and thought this one was brought on by partaking liberally of a late supper. The stools were very numerous, clay-colored, and contained some mucus, but no blood. His temperature was 100.8° F., and his pulse 100. In spite of the numerous stools and the fever which next day reached 101.8° F., he had but little discomfort. The physical examination was negative except that the sclera were a little icteric. Under the administration of intestinal antiseptics the number of stools decreased and the patient felt brighter. On the 9th, as the temperature and pulse were normal the patient was allowed to go to his office. Three days later, he sent for me again, reporting that he had felt better on the 10th, but that the next day the diarrhea and fever had recurred. His tempera-

¹Irving Phillips Lyon. Coincident Typhoid and Malarial Infection, Johns Hopkins Hospital Reports, Vol. VIII., p. 263.

ture was 103.2° F., pulse 96. The course of the fever is shown by the chart. He was put to bed on a milk diet. The physical examination was still negative. He complained of nothing except drowsiness during the day and of restlessness at night; the next day percussion showing the spleen to be a little large, a specimen of blood was sent to the Board of Health for a Widal test. A negative report was rendered. The stools were now of the peasoup character.

On the 17th the edge of the spleen was palpable. The urine failed to show Ehrlich's diazo-reaction.

My attention had shortly before been attracted by an article by Hiss, in the *Journal of Experimental Medicine*, on "A Method of Isolating and Identifying the Bacillus Typhosus," and to him I sent a specimen of the patient's stools. The next day, the 18th, and apparently the nineteenth day of the attack, his temperature was again normal. On the 21st the report on the feces was returned, stating that the typhoid bacilli had been found. Another specimen of blood was immediately sent to the Board of Health and a positive Widal reaction was obtained. The unusual feature of this case was the subsidence of fever on the eighth day of the disease. The well-known fact of the late development of the agglutination test in some cases needs no further comment. By a peculiar coincidence, during this patient's illness a report appeared in the *New York Medical Journal*, by Brill, on "A Disease Resembling Typhoid Fever."¹ He cited seventeen cases running a short course, offering nearly all of the classical symptoms of typhoid but not presenting the Widal reaction, and differing in minor details; he could afford no satisfactory explanation of the etiology of these cases.

Proof seems to be accumulating that there is a disease which resembles typhoid clinically and in such a case bacilli have been cultivated from the blood which morphologically resemble Eberth's bacillus, but differ in some respects. The essential point is that such cases give a negative serum reaction. These cases are rare. The case cited, of course, did not belong to this category, but in its course bears some resemblance.

A mild attack of typhoid, though usually running to a successful issue, is by no means to be looked upon with unconcern. Because the patient is comfortable and the temperature is low, a haste to comply with the patient's wishes may prove disastrous, resulting, perhaps, in a hemorrhage, as in the case cited. Two of the worst cases I have met with have been in relapses from exceedingly mild initial attacks. The rule that a patient should be carefully restricted until the temperature has been for some time normal holds for light cases as well as for severe ones. Living by the thermometer, however, is irksome for patient and physician and one is

tempted to second the wish I have heard old practitioners express, that all thermometers might be at the bottom of the sea.

These little recrudescences may be due to various causes, e.g., a too liberal diet, constipation or nervousness. A starvation temperature is also to be remembered. A patient of mine, a young man, whose temperature had been normal some time, discovered on one occasion that the thermometer registered a degree above normal, and was canny enough to attribute it to the excessive heat of the day and forced all the family to take their temperatures. Every one of them showed an elevation of one-half to one and one-half degrees above normal and the same result was obtained from other healthy individuals that day. I remember, when on service at the New York Lying-in Hospital, that one hot day all but one of a dozen patients in a ward registered a temperature from one-half to one degree above normal, which subsided with the cool of the evening.

One is prone to allow a patient convalescing from a light typhoid to resume his occupation too early, presuming on the rapid gain made in convalescence. I made this error in one of my cases and saw the patient later forced to withdraw from his business for a much longer time than would have been necessary, probably, had a longer period for convalescence been insisted upon.

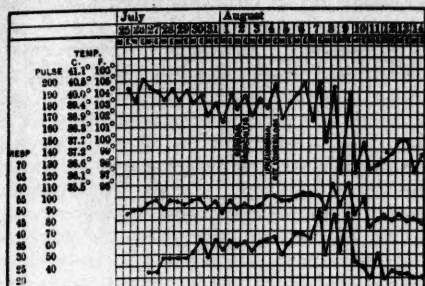
Amid the anxieties and perplexities of a serious case we are often neglectful of minor manifestations and are frequently surprised into harking back dimly to experiences of our own when the like is presented by others. We note the development of a functional murmur in a weakening heart, we determine the cardiac impulse and outline, study the condition of the arterial system, watch the various phases with the progress of the disease and then in our interest compare the notes on our previous cases, finding them, to our disgust, a Sahara; or, perchance, our attention is called to unusual rashes and we find upon our notes that in her relapse "M. W. developed a rash that itched and looked like urticaria" and look in vain for more regarding it; or remembering that another case showed a brilliant scarlatiniform eruption of extensive distribution, we find that no note at all has been made of it.

The respiratory tract in typhoid fever forms a chapter by itself. We expect some congestion of the upper air-passages in most cases of moderately severe typhoid, expressing itself by a slight cough or a mild degree of deafness. In many cases we have a bronchitis of varying intensity and far more rarely a pneumonia.

The case of the accompanying chart was one in which an exceptionally sharp bronchitis prevailed. Note the respiration curve during the first week or ten days. I feared a bronchopneumonia in this case, but was never able to localize any area of consolidation. This case was removed to New Bedford Hospital during a seri-

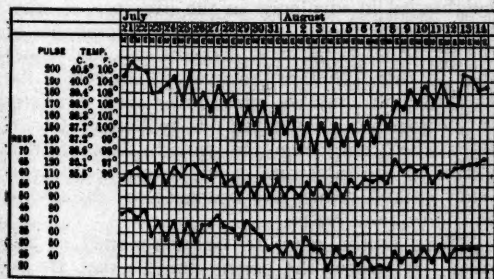
¹ N. E. Brill. A Study of Seventeen Cases of a Disease Clinically Resembling Typhoid Fever, but without a Widal Reaction, *New York Medical Journal*, Vol. 67, p. 77.

ous relapse which was followed by a second relapse with eventual recovery. The patient was forty years of age. In this case I got very gratifying results from the use of ice-bags in the



axillæ and groins as adjuvants to the sponge-baths to control the temperature.

Pneumonia may occur early in the disease and so dominate the picture that the typhoid is recognized only late or not at all; or it may occur later and, if at the height of the fever, produce so little change in the temperature curve as to be overlooked unless routine examinations of the chest be made. If it occur late, there is an exacerbation of the fever to give a hint of its presence. It is always a serious lesion. Pneumonia in typhoid fever may be lobar, lobular or of the so-called hypostatic variety and the organism present may be the micrococcus lancetatus or Eberth's bacillus. As an example of a late pneumonia I quote the following:



In July, 1898, there came under my care a lad of sixteen years with a well-developed typhoid. He was apparently in the second week of the attack and had a temperature of 104.2° F. and a pulse of 88. He was drowsy, had a little headache, was constipated and an examination revealed rose spots and an easily-palpable spleen. He had a rather severe type of fever, the nature of which you will see by consulting the chart. Five days later, on what was reckoned the fifteenth day of the disease, a note was made that the patient had a slight cough and a few râles were detected at the left base. On the eighteenth day sibilant and coarse râles of a general bronchitis were heard over both sides of

the chest. The next day the signs were more marked and the breathing was a little asthmatic in character. On the morning of the twentieth day there was, in addition to the râles, restricted breathing over the lower right chest posteriorly, and in the evening over this area there were dullness, bronchial breathing, and subcrepitan râles. On the twenty-second day, in addition to these signs, the breathing became restricted over the left base. The respiratory rate was increasing during this time to 40 above. On the twenty-fourth day the temperature dropped from 104 to 99° F., went up the next day to 104° F. and dropped to 97° F. in the morning, only to repeat this change in the next twenty-four hours, after this crisis remaining normal with slight fluctuations. On the twenty-sixth day, the day of the final drop, the bronchial breathing could no longer be heard and from this time on resolution occurred, though all signs did not clear up for three or four weeks. The right lower lobe I considered to have been the site of a lobar pneumonia. The restricted breathing over the left was due, I think, to hypostatic congestion.

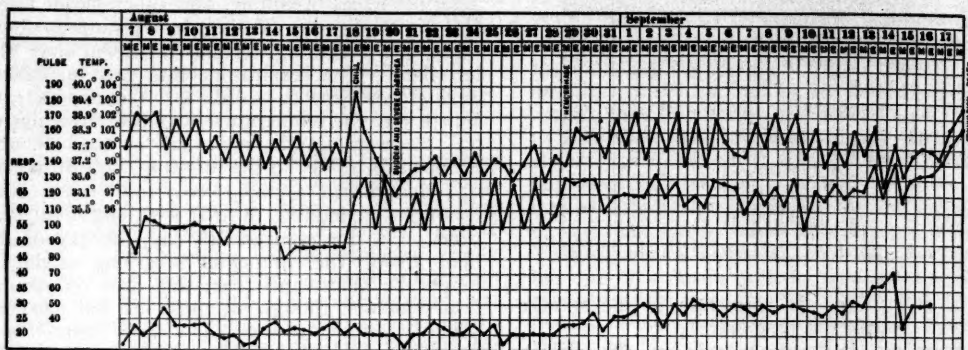
Crises do occur in typhoid fever, but according to Hare they are rare. This crisis I think due to a deference of the pneumonia, the febrile reaction due to the typhoid having abated during its continuance.

Now and then there comes to us a case of more than usual interest, replete with difficult problems and rare manifestations, finally leaving to us as a heritage the everlasting why? Such is the case that follows, which even at the risk of tiring you, I beg to be allowed to report somewhat in detail.

The patient was a woman sixty-one years of age, with a decided tendency to corpulency. She had always been remarkably free from ailment of any kind and was the picture of health at the time of the attack. At that age typhoid fever is not common, as you know, and the consensus of opinion among writers is that it is a grave disease, "the mortality increasing with the years after forty" (Hare); and yet the temperature curve in these cases is not high and is apt to be irregular. I first saw her on August 4, 1899. She said she had not been feeling well for two weeks, had a poor appetite, was constipated and had a headache each morning. Two days before and again on this day she had had a chilly feeling followed by some fever. Her temperature was 101.5° F. and her pulse 100. The physical examination was negative. Her bowels were moved freely and the next day as her condition showed no improvement she was sent to bed and put on a milk diet. Two days later her temperature reached 102.2° F., and then steadily decreased, as may be seen by the chart. Her illness promised to be a very comfortable one and the progress was favorable until the end of the second week (from the time she took to her bed), when, after a sudden chill, the temperature rose to 103.8° F. and the pulse to 120. The temperature subsided the next day and re-

mained almost normal for ten days, undergoing excursions of not more than one degree. I do not know what was the cause of this sudden rise. During this attack no spots were seen and it was impossible to make out splenic enlargement

a change in the phase of the typhoid or a dysentery? I believe it was the latter. It came on simultaneously with a sudden outbreak of a number of cases in the town, was accompanied by a great deal of abdominal pain, traces of blood



on account of the thickness of the abdominal parietes.

Mild as this initial attack was as regards temperature and personal comfort, no doubt the chart has revealed to you one factor significant of low resistance, the pulse-rate, which had been persistently high.

Two days after this chill, August 20th, the weather suddenly became excessively warm and within twenty-four hours I was called to see ten or a dozen cases of diarrhea, some of them dysenteric in character, passing blood and mucus. These sudden epidemics, if I may so dignify them, coming on within a few hours, I have met again and again in my summer practice at the seashore; they appear usually with marked changes in the weather and are attributable in most cases to no indiscretion in food, drink or exposure. On this day, in common with other cases, the patient had a sudden and very severe diarrhea. The stools were flecked with blood and caused a great deal of abdominal pain. Tenderness was marked over the sigmoid flexure. A cathartic of castor oil was given and intestinal antiseptics and small doses of opium were employed with promising result. For five or six days the condition improved and then the stools became more numerous and very offensive. The tenderness over the sigmoid increased. On the 28th she had a fairly comfortable day, but at eleven o'clock the next morning had an intestinal hemorrhage of from a half pint to a pint. Ice was applied to the abdomen and morphine administered hypodermically.

From this time on you will note that the character of the chart changes. The temperature rose, the curve became very irregular and the pulse curve grew more ominous every day. The patient was suffering a relapse of the typhoid and a severe one. Hare says that relapses after mild initial attacks are more common than after severe ones. Was this attack of diarrhea simply

in the movements and tenderness in the left iliac region which increased up to the time of the hemorrhage. The hemorrhage may have been due to a dysenteric ulcer or a typhoid ulcer, probably the latter, the process of ulceration being hastened by the colitis.

Those of you who have read the highly interesting and instructive Gloustonian lectures on The Typhoid Bacillus and Typhoid Fever by P. Horton-Smith¹ will recall his discussion of relapses in typhoid fever. Briefly he considers that auto-intoxication plays an important rôle and shows that the action of typhoid toxins is heightened in virulency in the presence of other toxins, even those of the normal inhabitants of the intestinal canal, *e. g.*, bacillus coli, and shows that in turn other organisms and especially the bacillus coli increase in number and virulency in the presence of the bacillus typhosus. Conditions which encourage the growth, then, of other germs in the intestinal canal, heighten the virulency of and reduce the resistance of the system to the typhoid toxin.

These truths seem to be exemplified in this case. Whatever the germs may be that are responsible for the simple dysentery we are accustomed to see, as in this case, whether the bacterium coli commune, the proteus vulgaris, the streptococcus or a staphylococcus, their presence and growth may explain this relapse and its very severe character.² During the first week of the relapse the stools became more infrequent and tympanites of a marked and persistent character intervened. The patient became more drowsy and grew weaker, the pulse running from 110 to 130. During the second week the condition was practically unchanged, except for a more marked apathy and the appearance of subsultus tendinum. In the middle of the third

¹ Lancet, Vol. I., 1900, p. 821.

² With reference to this, see recent article by Vedder and Duval on "The Etiology of Acute Dysentery in the United States," Journal of Experimental Medicine, Vol. 6, p. 151.

week the patient began to be delirious and the evacuations became involuntary. The febrile excursions were more marked and the pulse was weaker. At the end of the week the patient was fast failing, râles appeared in the chest, respiration became rapid and arrhythmic and soon Cheyne-Stokes in character. On the last day of her illness the pulse went up to 166, the respiration to 44°, though râles in the chest were gone. In the morning it was noticed that the legs were stiff, and early in the afternoon the left hand began to twitch, followed by clonic spasm of the masseters and shortly after by a general convulsion. Two hours later another convulsion occurred, beginning with nystagmus, strabismus involvement of the facials, producing the risus sardonicus, never to be forgotten when once seen, and spreading to the whole body. This lasted twelve minutes in spite of the use of amyl nitrite, and of chloroform. Two hours later another convulsion ensued in which she died.

Convulsions in typhoid are not of common occurrence and yet nearly all the writers who have treated of the disease extensively mention them. In many of the cases meningitis is suspected and, indeed, true meningitis does exist, due to the streptococcus, to the pneumococcus or, in rare instances, to the bacillus typhosus; in other cases only a simple congestion of the meningeal vessels is present and several instances have been recorded in which the postmortem findings were absolutely negative. Thrombosis of the cerebral sinuses or arteries may cause local or general convulsions. As an autopsy was not secured in this case the cause of the convulsion can at best but be conjectural.

As regards treatment I have little to say. My own method is the one so largely adopted at present, consisting simply of keeping the patient on a milk diet and controlling temperature by baths and sponging. Theoretical considerations appeal strongly for intestinal antiseptics, but clinical evidence in their behalf arouses no enthusiasm, while what the Germans call the *Nebenwirkung* of the drugs always haunts one as possessed of unpleasant possibilities. Too rigid observance of milk diet, an observance which in some instances becomes slavish, is to be decried. I am sure I have seen unpleasant consequences in a case of my own by failing to appreciate the folly of continuing a food that the bowel clearly would not dispose of, simply because it was labeled milk.

To one procedure I desire to call your attention, if it is not already familiar to you, and that is the prophylactic use of urotropin. I remember the interest with which I read Mark Richardson's article in the *Journal of Experimental Medicine* (1899) "On the Value of Urotropin as a Urinary Antiseptic, with Especial Reference to Typhoid Fever," on account of the promise it held out. He had called attention the preceding year in the same journal to the fact that the urine of typhoid patients in 25 per cent. of the cases he had investigated showed the ba-

cillus typhosus and that they could be found long after convalescence—week, months and even years. The statement requires no comment on the danger of dissemination it entails. He found that in every instance the use of urotropin caused disappearance of the germ in a short time. He advises its use for ten days at the end of the fever. His work has since been corroborated by other observers, notably by P. Horton-Smith. As no harm has been noticed in prolonged use of the drug, one can give five grains three times a day for three or four weeks, beginning as the temperature approaches normal.

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ADRENAL SUBSTANCE IN THE INTESTINAL HEMORRHAGE OF TYPHOID FEVER.

BY WARREN COLEMAN, M. D.,
OF NEW YORK.

THE local hemostatic action of adrenal substance on various mucous membranes is well known and needs no further comment. Adrenal substance exerts a similar hemostatic action when administered internally, locally on such portions of the mucous membrane of the alimentary tract as it may reach and also upon various bleeding areas while circulating in the blood. Reports of such action have appeared and are appearing in the literature from time to time; for example, adrenal substance has been used successfully in hematemesis from gastric ulcer and cirrhosis of the liver, in hemoptysis and hemorrhage from uterine fibroids; but, so far as I am aware, it has not been used in the intestinal hemorrhage of typhoid fever. During the past two years I have treated five such cases with adrenal substance. Four of the patients recovered, though in two of them the hemorrhage was very severe. The fifth patient died of toxemia and exhaustion several days later and not of hemorrhage, as was shown at the autopsy. While I am not prepared to say that recovery in the four cases was directly due to the action of adrenal substance, I feel that, in view of our utter helplessness when using the ordinarily recommended hemostatics in the intestinal hemorrhage of typhoid fever, I am justified in advocating the free administration of adrenal substance in these cases. Certainly no harm can be wrought by this treatment when ordinary care is taken, for even very large doses of adrenal substance may be administered without deleterious effects, as happened in one of my cases owing to an order which was misunderstood by the nurse.

A brief account of two of the cases will suffice to illustrate the action of adrenal substance in intestinal hemorrhage.

Case I.—Male, aged twenty-seven years. Very severe hemorrhage early in the evening of September 23d, the patient losing from three to four pints of blood. He was immediately given fifteen grains of adrenal and the dose was repeated every hour during the night. There were slight

hemorrhages—at least blood was passed in the stools—at one and two-hour intervals the same night. The patient's temperature was 103° F., and an ice-coil was kept on the abdomen. On the following day fifteen grains of adrenal were given three times a day, and the ice-coil was continued until September 26th; no further hemorrhages occurred after the first night.

Case II.—Female, aged forty-three years. Severe intestinal hemorrhage September 22d. Adrenal substance was immediately given, fifteen grains every two hours during the day and every four hours during the night. The next day the stools were tinged with blood, and adrenal was given in fifteen-grain doses three times a day. On the third day only faint streaks of blood were present in the stools, and treatment was continued in the same manner. No further hemorrhage occurred.

In view of the success which has attended the administration of adrenal substance in these five cases, my present plan, on assuming charge of a case of typhoid fever, is to order five-grain powders to be kept in the sick-room and to give instructions to the nurse to administer one powder on the first sign of blood in the stools, repeating the dose every hour until I can be reached.

When the patient is conscious the powder may be placed on the tongue, chewed a little and swallowed with a little water. In a profound typhoid state, the powder may be given in suspension in water or in a little milk. Occasionally, the first dose produces slight nausea; this did not occur in any of my cases, however. When nausea follows the administration by mouth, ten grains of the powder may be given by rectum, if the diarrhea is not too frequent, and the dose repeated every hour or two. If neither the stomach nor rectum will tolerate the drug, Schaffer's suggestion of an intravenous injection may be tried, but not more than two or three grains should be so given.

I have also had a case of purpura hæmorrhagica with severe hemorrhages from the nose, gums and bowels, and extensive cutaneous extravasations, in which adrenal substance was successfully given. The extent and the severity of the hemorrhages will be appreciated when I say that the patient was compelled to sit up in bed and hold a basin to catch the blood that was continually flowing from the nose and mouth. On entrance to the hospital, he was immediately put upon fifteen grains each of adrenal substance and calcium chloride, three times a day. This treatment was continued for the six following days with gradual subsidence of the hemorrhages and their complete cessation on the fifth day. Of course, in this case it is impossible to say how much of the benefit resulted from the adrenal and how much from the calcium chloride.

To illustrate the local action of adrenal substance in the stomach a recent letter of Soltau Fenwick¹ to the *British Medical Journal* may be

quoted. He writes that in severe hæmatemesis he has abandoned all other remedies in favor of adrenal substance and he believes that he has saved the lives of at least five patients in the last eighteen months by this treatment. His plan is to give ten ounces of a freshly-prepared decoction of adrenal powder, containing two grains to the ounce, as soon as possible after the beginning of the hemorrhage, and to repeat the dose in two hours. In two cases in which melena was the only symptom he gave three doses in four hours. He has obtained the best results in comparatively recent ulcers near the cardiac end of the stomach. In chronic ulcers of the pylorus, when the eroded vessel was of large size and embedded in firm connective tissue, he found the adrenal to be of little use. He has also used with benefit enemata of adrenal substance in inoperable cases of cancer of the rectum for the control of hemorrhage.

PATHOLOGY OF TYPHOID FEVER.¹

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THE bacillus typhosus within the system is the cause of typhoid fever. Eberth, Klebes, Gaffky, Koch, Arthaud, Pfeiffer, Friedlander, and many others have identified this bacillus. It is about one-third the diameter of a red blood-corpuscle in length, one-third as thick, and it is rounded at the extremities. A shining rounded body may sometimes be observed at either end or in the center, which may be either a spore or a protoplasmic degeneration. The bacillus occurs singly or many bacilli may be joined together, end to end. It possesses vibratile cilia which permit its characteristic motility. Its general appearance differs somewhat according to the culture media employed.

The life of the bacillus is uncertain. Active bacilli have been found in the human fifteen months after convalescence. They seem to continue to live indefinitely in filth, in privy vaults, and in moist earth. They multiply in water and maintain their vitality in ice. Sunlight destroys them, however, in a few hours. Electrolysis also destroys them. Zeit (*Jour. of Amer. Med. Assoc.*, Nov. 30, 1901) reports the death of typhoid bacilli in bouillon cultures after exposure to a continuous current of one hundred milliamperes for seventy-five minutes at a temperature of 102° F. The most frequent media through which they are conveyed to man are water, milk, sewage contamination, dust and shellfish, especially oysters. Flies also purvey the infection.

It has often been observed that the source of infection in milk was usually through the water employed to wash the cans or to dilute the milk, and that, if the organisms were respired, some were carried into the alimentary canal by food or drink. Some claim that the bacilli

¹ Brit. Med. Jour., 1901, Vol. II, p. 1596.

¹ Read before the Louisville Pathological Society, Dec. 16, 1901.

must enter the system through the intestinal glands or by inoculation, never by the respiratory tract; but this is unproved. Any age may be affected by typhoid fever, the fetus *in utero* or the nonagenarian. Many observers have identified bacilli in the heart and spleen of the fetus and in the placenta. Hamernyk reported the case of a patient ninety years of age. The adolescent male, however, is most frequently affected.

Exhaustion of any kind predisposes to an attack, but influenza has been observed frequently to precede the disease. Pregnancy renders no immunity and the fetus is usually so affected that abortion, miscarriage or premature labor occurs in the larger proportion of cases. In this country the disease is most frequent in the fall of the year, the poison having been concentrated by the drouths of the summer; the disease is correspondingly less frequent during the spring, owing to the dilution of the poison by early rains. No race is immune, but temporary immunity has been observed in various individuals, and a second attack rarely occurs in the same individual.

Although the bacillus is in an active state when discharged in the excreta, it is generally believed that a period of extra-corporeal development occurs before the organism again infects the human. The period existing between the time of introduction into the system of the poison and the manifestation of symptoms is usually from ten to twenty days, in rare instances symptoms occur as early as two days. The bacilli have been found in the blood, in the lymphatics and in the tissues generally; especially in the blood from the rose spots, the intestinal glands, the spleen and the liver. They have been found in the gall-bladder, in the placenta, in the fetus and in abscesses. One case of an ovarian cyst, removed three years after an attack, is reported, in which active bacilli were present. They are excreted in the feces, in the urine and in the sputum.

The bacilli are the direct cause of the disease, but they liberate toxin in the system—the typho-toxicon of Brieger, the toxalbumin of Fraenkel and the ptomain of Vaughan—which is responsible for the fever, the vomiting and the purging that occur.

This toxemia produces changes in the blood. The fibrin is diminished, the leucocytes are increased and typhoid antibodies or enzymes are present in the blood. Loomis states the severity of an attack to be in direct proportion to the diminution of the fibrin of the blood and to the leucocytosis after the characteristic symptoms of the disease are manifest.

The enzymes in the blood digest the outer coat of the bacillus and thus cause the clumping and agglutination of the bacilli described by Vidal. This altered state of the blood, according to Loomis, causes changes of the nature of parenchymatous degeneration in all the structures of the body. The spleen is the earliest to manifest these changes and is affected in ninety-eight per cent. of the cases; it becomes enlarged,

soft and pigmented. The liver likewise becomes soft and flabby. Gould says that typhoid infection of the gall-bladder is probably always present during the course of the disease. Keen collected thirty-four cases in which empyema, cholecystitis, or ulceration were present without gall-stones; therefore these conditions were entirely dependent upon typhoid infection. Von Dungen reports a case of abscess about the gall-bladder which contained active typhoid bacilli fourteen and a half years after the disease. The kidneys undergo degeneration and may be the seat of infarctions. The urine becomes twice as toxic as the normal urine and contains certain aromatic bodies which give rise to the diazo-reaction of Ehrlich. Perinephritic abscesses are not uncommon. The heart, next to the spleen, is the seat of the most marked parenchymatous changes; it becomes soft and flabby and may be pigmented, or a condition similar to amyloid degeneration may occur. Thrombi are sometimes found within its chambers. The lungs are characterized by changes peculiar to typhoid fever, undergoing a "splenization" which is neither a true pneumonia nor yet static in type. Bronchial inflammation is so common as to have caused the name of bronchial typhus to be suggested. The larynx and Eustachian tubes may become ulcerated. The brain and nervous system are always affected. Cases of typhoid fever have been reported without the rose spots, cases without the intestinal lesions; but no case without the nervous phenomena has ever been observed. The walls of the stomach undergo degeneration and its glandular structures are so affected as to cease to secrete the gastric juices. Buchan (*Phil. Med. Jour.*, July 6, 1901) and Barjon and Lesieur (*Jour. Amer. Med. Assoc.*, July 20, 1901) have reported cases of arthrotypoid, or cases in which marked arthritis occurred. The muscles in general undergo two kinds of degeneration—a granular or fatty degeneration and a waxy or vitreous degeneration. The salivary glands undergo hyperplasia and pigmentation. The skin is the seat of a characteristic lenticular eruption, beginning between the sixth and twelfth days. These so-called rose-colored spots vary in size from a point to a line and a half; they may coalesce and are most abundant over the abdomen.

These changes are regarded by some to be as constant a phenomenon in typhoid fever as is the rash in scarlet fever.

The subcutaneous cellular tissue may become the seat of ulceration or furunculosis. The mesenteric glands undergo changes similar to those of the intestinal glands. It was formerly said that, if there were a pathognomonic lesion in medicine, it would be the intestinal lesion of typhoid fever. Typhoid fever, however, has been observed by the medical world at large for about fifty years only, and even in the last year additions have been made to its pathology.

In this paper it is especially desired to empha-

size the probable pathologic conditions in those cases of typhoid fever which are apparently shortened in duration. According to Loomis there are three varieties of changes that occur in the intestinal glands. The first and most common type is that in which the mucous membrane of the ileum, the Peyerian patches and the follicles near the ileocecal valve undergo a catarrhal inflammation during the first week of the disease. During the second week the inflammation of the mucous membrane subsides, increasing the hyperplasia of the glands, which progresses to ulceration, to be followed by sloughing or necrosis in the third week and cicatrization or repair in the fourth week. Intestinal perforation and hemorrhage may occur with these changes.

In the second or next most common process the termination is by the tissue between the follicles remaining infiltrated and elevated while their contents are absorbed, or individual follicles of the agminated glands rupture and discharge their contents into the intestine, leaving depressions which give the glands a reticulated appearance.

The third variety of pathological change in the intestinal glands is perhaps the least frequently exposed to the eye of the observer. However, if all the glands affected in all cases of typhoid fever could be counted and their entire course observed, it is my personal belief that this process would be found to be by far the most common of the three varieties of changes. Loomis best describes these changes: "During the first week there occurs a catarrhal inflammation of the intestinal mucous membrane, most marked about the Peyerian patches, with a medullary infiltration of these and the salivary glands. The mucous membrane becomes hyperemic, the glands become enlarged and elevated, the co-called shaven-beard appearance. These changes begin within forty-eight hours after the onset of the disease, but are not fully developed until the end of the first week. During the second week the hyperemia disappears from the mucous membrane, and, instead of hyperplasia occurring in the follicles, instead of the slough or ulcer forming, instead of the follicles remaining infiltrated and elevated and the glands rupturing, the new elements in these ductless glands become disintegrated and undergo absorption and in this way gradually undergo resolution." Thus by the end of the second week, without ulceration, the process is complete.

This is the classical pathological procedure in the mesenteric glands. This is the change that occurs most frequently in the typhoid of children, in whom the duration of the disease is never classical, who practically always shorter than in the adult. Most probably this is the process that occurred in the cases alluded to by Gould (*Phil. Med. Jour.*, March 3, 1900), who says that, while the intestinal tract exhibits the lesion of the morbid process in the vast preponderance of cases, it has

now been definitely established that the intestines may be uninvolved. The disease may appear in the form of a true general infection or septicemia; or be localized in one or another or several viscera, as the spleen, the lungs or pleura, the cerebral meninges, the kidneys, etc. This absorption, without ulceration, is probably the classical process in relapses in which the fever frequently ends almost by crisis on the fourteenth day of the relapse. This is believed to be the change that occurs in by far the greater proportion of glands involved when the fever ends in the third week instead of in the fourth week, which latter has been regarded as classical. This is believed to be the change that occurs in a large number of cases observed by almost every practitioner, and in similar cases recorded by Loomis, Pepper, Osler and many others, in which the disease has lasted only two weeks; many of these cases had no medical treatment, and are referred to in textbooks as abortive and ambulatory typhoid. Resolution by absorption and not ulceration is unquestionably the process that took place in the cases reported by E. Fraenkel, A. Lambert, Henshaw, Brennan, Rumpf, Von Jaksch, Kraur, Walger and others, in which the disease was limited to less than fourteen days' duration by means of serum treatment. These reporters alone observed this limitation in more than a hundred cases.

Many cases are now on record in which autopsies have shown no intestinal ulceration, yet bacilli were obtained from the spleen and other structures. Ophuls (*American Year-Book of Medicine and Surgery*, 1901) describes a case of typhoid infection without intestinal lesions which occurred in a man of twenty-four who was admitted to the hospital in a semi-conscious condition. The diazo and Widal reactions were positive. The patient died a week later. The necropsy showed enlargement and softening of the spleen and lymph-glands, necrosis in the liver and multiple hemorrhages in the mucous membranes of the genito-urinary tract; bacteriological examination showed in the spleen large numbers of bacilli which had the characteristics of typhoid bacilli. Ophuls believes that in a certain number of these cases, which are apparently without intestinal lesions, infection has taken place in the usual way, through the intestinal mucous membrane, but that there has been no ulceration of Peyerian patches and the swelling has disappeared. McPhedram (*loc. cit.*) describes another case in which typhoid bacilli were found, but there was no intestinal ulceration; this patient died forty days after admission into the hospital.

An editorial in the *Journal of the American Medical Association*, July 30, 1901, entitled "Abenteric Typhoid Fever" says in substance that it has been properly pointed out that the lesions of typhoid fever are by no means confined to the intestinal tract, which may, and in fact occasionally does, escape involvement entirely. The article further cites the case of arthro-

typhoid of Barjon and Lesieur (previously referred to) in which the post-mortem showed no ulceration of the bowel.

Wm. A. Dickey (*Therapeutic Monthly*, 1901), considering the question of intestinal ulceration in all cases of typhoid, says, "This position can no longer be maintained," and refers to the paper of Vallaird, of Paris, read in 1890, in which a case was presented in which no intestinal ulceration occurred. Banti and Adnot each have reported cases. Osler has reported a case of typhoid in a boy, in which there was no disturbance of Peyer's patches. Flexner and Harris (of Johns Hopkins) reported a case in a man sixty-eight years old in which there was no intestinal ulceration. Dickey further says, "Numerous other cases are reported, so that we can no longer look upon the disease as one affecting the alimentary canal only, but rather one of a general character, a modified septicemia." So many cases are now on record that the impartial investigator can no longer doubt the frequent occurrence of genuine typhoid fever without intestinal ulceration. The action of the typhoid antibodies and other pathological conditions are not only still obscure, but can be studied only by the few.

At present it has been observed (*American Year-Book of Medicine and Surgery*, 1901) that (1) a single intraperitoneal injection of a typhoid culture into a guinea-pig results in the formation of antibodies; (2) the antityphoid power appears in the serum at about the fourth or fifth day; it increases until it reaches the maximum about the eleventh or twelfth day, when it diminishes but is still present a month after the injection; (3) the antityphoid power is small in the liver, the kidneys, the suprarenal bodies and the omentum. The value of the antityphoid power of the peritoneal exudate sometimes approaches that of the serum, but never surpasses it; (4) the bone-marrow and spleen are frequently more active than the serum; (5) the lymphatics and the blood may each be concerned in the formation of these antibodies; (6) the antityphoid action of these bodies has been positively demonstrated; (7) there may be an agglutinating principle separate and distinct from these antibodies.

It is only in recent times that any attempt has been made to separate these constituents of the blood. But certainly the antityphoid strength of a serum, very frequently corresponds with the power of its agglutinating action. The tendency of modern pathologists is to the opinion that true typhoid toxemia is limited in many instances to fourteen days, and that the manifestations after that time are usually dependent upon intestinal ulceration.

Therefore, since pathology has shown that no intestinal ulceration is essential to typhoid fever, and since true typhoid toxemia is often limited to fourteen days, and as the action of the typhoid antibodies and enzymes becomes better understood, it seems not unreasonable that therapy may

soon claim to so modify the course of typhoid fever as to limit its duration in the great majority of cases to fourteen instead of the too classical twenty-eight days.

Second and Burnett Streets.

MEDICAL PROGRESS.

SURGERY.

Surgery of the Posterior Fossa.—While results from work on the posterior fossa and its contents have not been productive of most brilliant results, still life has been prolonged and made bearable and in a number of cases saved. The opportunity has been afforded to report several such cases to C. F. BARBER (*Brooklyn Med. Jour.*, Mch., 1902). In operating, he prefers opening the skull in the posterior fossa, as the various parts are more readily exposed, and drainage is more efficiently accomplished. In the first case pressure symptoms were marked and a cerebellar neoplasm was thought of. On opening the cranial cavity through the posterior fossa, a goodly quantity of fluid escaped and the pia seemed to be the site of a tuberculous inflammation. The wound was partially closed and silkwormgut drainage inserted. The fluid escaped for several days and symptoms disappeared entirely; recovery was perfect. In another case marked by attacks of tonic and clonic contractions of the extremities, loss of sense of direction, strabismus, headaches, areas of anesthesia, a diagnosis of cerebellar tumor, solid or cystic, was made. The operation was instituted in the same way and on lifting up the cerebellum a cyst was ruptured. The wound was closed, with drainage and in three days consciousness returned. Other symptoms were ameliorated, but in three weeks the patient died. The autopsy showed a cyst in the other hemisphere which had not been discovered. The author draws attention to the advantage of drainage in the most inferior point of the cranium as against puncture through the fontanelles and direct drainage of the lateral ventricles.

Gastrojejunostomy.—An interesting case in which this operation was done and which came to autopsy six years later is reported by A. H. CORDIER (*Jour. Amer. Med. Assoc.*, Mch. 1, 1902). The reason for the operation was the presence of a pyloric stenosis due probably to contraction from the healing of a non-malignant ulcer. The stomach was found very much dilated, with the pylorus low down, and the anastomosis was made with a Murphy button at a point in the anterior wall about four inches from the pylorus. A portion of jejunum about eighteen inches below the pylorus was selected as the site of application. The patient made an excellent recovery and had no further symptoms referable to his previous condition. Six and a half years later he died as the result of an acute pneumonia. On autopsy a complete obstruction of the pylorus was found; the stomach had regained its former size, with the musculosa healthy and well developed, while the unused duodenum and jejunum were atrophied. The Murphy button instead of being passed *per rectum* had dropped back into the stomach and remained there until the time of death without causing any symptoms. As this accident has been urged as an objection against the use of the button, mention of such a case causes it to lose some of its force, and the author believes that the great advantages to be gained certainly outweigh this doubtful source of danger.

Gastric Ulcer and Appendicitis.—Appendicitis is a difficult disease to diagnose when the symptoms are

at all obscure. Among the lesions which may resemble it is perforated ulcer of the stomach. C. A. B. HORSFORD (Lancet, Feb. 15, 1902) reports the case of a patient, thirty-two years of age, married. Five days previously, before breakfast, she had an attack of pain in the abdomen most marked in the right hypochondrium. Vomiting persisted at intervals throughout the day; there were jaundice, tenderness over the gall-bladder, flaccidity of the abdomen without distention, normal temperature, and no signs of collapse. For two years she had suffered from indigestion with occasional vomiting, but never hematemesis. About a week after she was admitted to the hospital, the temperature rose to 100° F., and two days later another severe attack of pain occurred; the right leg was drawn up, and tenderness at McBurney's point and slight bulging in the right iliac fossa were marked. Bile-stained vomiting followed by stercoraceous vomiting appeared in the evening. The temperature was then 100° F. and the pulse 95. Nothing definite was made out through the vagina. A diagnosis of appendicitis was made, but operation was not considered necessary. She soon became decidedly worse. The pulse and temperature remained about the same but the abdomen had become generally distended, especially in the hypogastrium and in the right iliac region. Liver dullness was present and there was dullness over the lower part of the abdomen. By the vagina a tumor mass was now made out, which was confirmed by the rectum, and a large amount of fluid was felt in the pelvis. The patient suddenly grew worse and died before operation was undertaken. At the autopsy it was found that an ulcer of the stomach had perforated and that an abscess had formed between the coils of the small intestine in the right iliac fossa, extending downward into the pelvis and upward along the ascending colon. This case is rare in its great similarity to appendicitis and therefore deserves notice.

Operative Interference in Spinal Fracture.—Spinal operation has proved comparatively free from the drawbacks attending intracranial surgery. This fact, together with the serious, painful and usually fatal nature of the lesion under consideration, renders the question pertinent whether it is not wise to operate early in the hope of relieving the pain and improving the course of the average case. The conclusions of G. L. WALTON (Boston Med. & Surg. Jour., Mch. 6, 1902) are as follows: (1) There are no symptoms which establish (otherwise than through their persistence) irremediable crush of the cord. (2) While total relaxed paralysis, anesthesia of abrupt demarcation, total loss of reflexes, retention, priapism and tympanites, if persistent, point to complete and incurable transverse lesion, the onset of such symptoms does not preclude a certain degree of restoration of function. (3) The prognosis without operation is grave. (4) While the results of operation are not brilliant, they are sufficiently encouraging to warrant one in making the practice more general. (5) In most cases it will be wise to operate within a few days of the injury; but a delay of some hours is advisable, partly on account of shock and partly to eliminate the diagnosis of simple distortion. (6) There is no infallible guide as to the extent of the lesion. The operation, at the worst, does not materially endanger life nor affect unfavorably the course of the case, and may, at least, reveal the lesion and lessen the pain; it may sometimes save a patient from death or invalidism of the most distressing character. Instead of selecting the occasional case for operation, one should rather select the occasional case in which it is contraindicated (the patient with great displacement of the vertebrae, the patient with high and rising temperature, the patient plainly moribund, the

patient still under profound shock). (7) The dura should be opened freely; it need not be sutured; drainage is not necessary.

Adrenalin in Local Anesthesia.—The addition of some active local hemostatic to the solutions in general use for the production of local anesthesia in operations is a plan which must strike every surgeon as at least suggestive. The experiment has recently been made and with considerable success, by C. A. ELSBERG (Amer. Med., March 1, 1902). Experimenting with adrenalin chloride, as supplied in the market, he finds that its addition in the proportion of from 1 to 5,000 to 1 to 20,000 solutions has a distinct value in minor operative work in that it almost completely abolishes oozing from the wound. Contrary to his expectations, there was no secondary bleeding or oozing, as has so often been described after the use of this drug. The pain after the operation was less than when cocaine or eucaine alone had been used. There have been no ill-effects; unfortunately, however, the experiment has not yet been made in larger operations, such as herniotomies, so that judgment as to its general applicability must still be held in suspense.

Pulsate et Aperitur Vobis.—In the history of a healthy-looking yeoman, about fifty years of age, as reported by JOHN DAVIES (Lancet, Feb. 22, 1902), one finds a record of tapping which it will be hard to equal. From 1896 to 1900 he was tapped one hundred and fifty times. The total quantity of fluid removed was over two hundred and fifty gallons. In October, 1900, he died of cardiac failure.

Burns from Celluloid.—Evidently some active legislation should be directed toward regulating the combustion point of toilet articles made from this very inflammable material. A. OGSTON (Lancet, Feb. 22, 1902), having had several serious cases of burns in patients who, wearing combs, etc., of imitation shell, had suffered fearful injury from their apparently spontaneous combustion, and wishing to establish some sort of intelligent standpoint from which to attack the nefarious manufacturers, conducted a series of experiments to determine if possible the etiology of these accidents. Control experiments were conducted by Professor Japp at the Chemical Laboratory of the University of Aberdeen. The conclusions of these experiments were as follows: (1) Celluloid articles of uncertain composition and dangerously explosive are everywhere sold and are in constant use; the conditions under which they may ignite in varying circumstances cannot be fully determined from experiments made in a physical laboratory. (2) Badly manufactured celluloid ignites at variable temperatures, which are so low as to make it unsafe for personal wear. (3) Restrictions should be imposed upon all articles which do not sustain without ignition a temperature equal to that sustained by well manufactured celluloid. (4) All celluloid articles for personal wear should have the words "ignitable" stamped upon them. (5) It is said that celluloid can be made incombustible by the addition of some chemical. If this be true, such addition should be made compulsory by legislative action.

Cleft Palate.—Because of the very vague proof afforded dogmatic statements by Treeves and others on the surgery of this malformation, the general trend of which teaches that no child, except under the most exceptional circumstances, should be operated on before the age of three years, W. ARBUTHNOT LANE (Lancet, Feb. 22, 1902) in a long and graphically illustrated article discusses the "pros and cons" of such limitations. Among others, he asks and answers very definitely the following pertinent questions: What is the best age for operation? What is the best method of operating? How and when can any complication, such

as harelip, be met to the greatest advantage? While there is perhaps nothing startlingly original about the details of his method of operation, save that it is clear and introduces several modified instruments which are necessary, because of the tender age of the patients, the age limit is, indeed, an innovation. He says that after operating on a very large number of cases the best results come from intervention during the fourth or fifth week. The only and sole contraindication possible is the depression arising from bad or insufficient feeding. The advantages of early operation are as follows: (1) The child bears the operation well; (2) but very slight subsequent discomfort is felt and the child will take food with satisfaction within an hour or two of the operation; (3) the amount of hemorrhage is very slight and it is easily controlled. The most important variation which one needs from the ordinary is a mouth gag with serrate edges, since these infants have no teeth to hold the gag in place, and, again, the average instrument has an unnecessarily powerful spring. In the presence of a complicating harelip, contrary to universal custom he leaves the lip untouched until the palate is repaired. All sutures should be passed from within out through the lip (the old harelip pins being discarded); these efficiently check hemorrhage and never can cause a scar.

Internal Derangement of the Knee-joint.—It may seem like a reversion to go back to Hey's old name, but J. M. COTTERILL (Lancet, Feb. 22, 1902) gives very considerable proof that the more modern term is very often a very misleading and erroneous name for a condition which can rarely be diagnosed with exactness save by exploration. Most writers are agreed as to the etiology. Probably in most cases it is an internal twist of the femur on the tibia. Stepping from rapidly-moving cars is a frequent cause. Football is, of course, the great factor in causing this condition. Miners and others who habitually kneel at their work are frequent sufferers from "derangement" of the knee. Rarely, if ever, is the lesion brought about by direct trauma to the cartilage. The pathology is more or less in dispute. Many good writers assert that the external cartilage is invariably the one to suffer. Equally good authorities—Cotterill among them—declare that in 90 per cent. of the cases it is the internal which goes wrong. In a series of most instructive photographs he shows that a very large proportion of the internal cartilages are split transversely, the coronary ligaments remaining intact. This is what leads him to feel that the term "dislocation" is incorrect. To the symptoms and diagnosis he adds some differential points. If seen before effusion takes place the knee can always be flexed fully and painlessly; full extension always gives pain. This is a diagnostic point between cartilaginous damage and injury to the general joint tissues. It is also of value in distinguishing between an injured cartilage and a "loose body," this being characterized by pain now on flexion; now on extension. Furthermore, in this condition one gets the characteristic "locking" which is not seen in injured cartilage. As to the treatment there is a general consensus of opinion that flexion, rotation away from the injury and extension will habitually remove the offending tissue and that after its removal it frequently happens that immobilization for three or more weeks will enable the freshly-torn surfaces to unite. In the rare cases of marginal protrusion of the meniscus a pad is of possible value; in the commoner central displacements it is not so. The indications for operation are simple. A patient under mid-life, who wishes to be active, who has neither rheumatism nor tuberculosis and whose cartilage is frequently giving him trouble, should certainly be operated on. In incising the joint, Cotterill enters by the usual

skin-flap, but cuts the capsule over the femoral rather than over the tibial surface, saying that otherwise it is not easy to determine how much the coronary ligamentous injury may have been traumatic and how much due to the operator's knife. Having exposed the cartilage it is dealt with as follows: (1) If wholly or to a greater part separated, excise it. (2) If separated from its anterior insertion into the tibia and curled into the joint, cut off the anterior portion as far back as the internal lateral ligament. (3) If much torn or frayed in front, do likewise. (4) If there be a torn tag or strip of the free edge of the meniscus projecting into the joint while the main part is in place, cut off the tag or strip and leave the uninjured part. (5) Under no circumstances is it advisable to stitch into place the cartilage or part of it, save occasionally when the injury is very recent. Removal of the cartilage is such a satisfactory proceeding that in suitable cases there seems no argument against excision. Nothing should be allowed to enter the joint; asepsis must be beyond all question. In two weeks the splint may be removed and the patient encouraged to move the joint a little in bed. Crutches may be allowed after three weeks. Violent exercise must not be thought of till after the fifth month.

Surgical Treatment of Quadriceps Paralysis.—A moderate number of cases of muscular paralysis, incurable by other means, have been benefited or cured by the surgical substitution of neighboring healthy muscles for those diseased. Another contribution to this subject is made by F. KRAUSE (Deut. med. Woch., Feb. 13, 1902) in which he describes a quadriceps paralysis in a boy of fifteen following anterior poliomyelitis. In addition to entire atrophy of the quadriceps, there was partial atrophy of the sartorius, much diminished contractility of the adductors, the semimembranosus and semitendinosus. The biceps was in good functional condition. In the leg, the flexors and peronei were least disturbed, but the calf muscles, tibialis anticus and extensor hallucis were almost entirely functionless. This condition was accompanied by a pronounced atrophy of the femur, tibia, and patella. Owing to the action of the flexors and the paralysis of the extensors, the leg was flexed on the thigh at an angle of 110° and with great effort could be brought to 145° . The weight of the body could not be sustained. The operative problem resolved itself into securing a stiff joint by an arthrodesm or substituting the functioning flexors for the quadriceps. The latter effect could be gained by using the flexors on the posterior aspect of the thighs (biceps, semimembranosus and semitendinosus) when transposed, as extensors, and leaving the gastrocnemius and popliteus as flexors of the knee. Even if the latter failed to functionate, the weight of the leg itself would passively carry out the motions. The operation was briefly as follows: After appropriate incision the biceps was isolated and severed at its insertion into the tibia. Exposure of the quadriceps showed it to be entirely atrophied. An opening was then made in the vastus externus close to the periosteum at a level corresponding to the point where the biceps is free from the bone, and the biceps itself is pushed through. The gracilis, semimembranosus and semitendinosus were likewise isolated, then cut off at their insertions, and pushed through an opening in the vastus internus. The sartorius was also finally separated. As the common extensor tendon was too much atrophied to permit suturing, the muscles noted were attached directly to the patella. It was hoped that the weakened ligamentum patellae would develop through use. Catgut was used throughout and the wound closed without drainage. An extension apparatus was applied to overcome the contraction due to

capsular ligaments and recovery was uneventful. In about seven months walking without assistance was readily accomplished. Movement of extension could be fully carried out and a slight degree of active flexion was possible. Three years after the operation the latter was possible to the extent of about 30° by the action of the gastrocnemius. All the muscles and the patella showed remarkable increase in development. In conclusion the author calls attention to the fact that no consciousness of the change of the musculature and its action was evident to the patient.

Death from Chloroform.—It has usually been considered that this anesthetic caused death by a paralysis of the ganglia in the walls of the heart, owing to the fact that without a sufficient dilution with air it passed rapidly from the lungs to the heart. This explanation will not account, however, for those cases in which chloroform is administered by drops or for those in which paralysis of the heart does not take place until long after the beginning of narcosis. Whether other factors may not be accessory to this is considered in an article by L. LAQUEUR (*Deut. med. Woch.*, Feb. 13, 1902) which was inspired by a fatal accident of this nature in his own practice. Autopsy in this case, that of a boy of fourteen, showed a persistent hyperplastic thymus gland, hypertrophy of the lingual tonsil, and marked enlargement of the spleen. As these phenomena have been observed in numerous instances by other observers, the author believes that their presence in children may be taken as a safe contraindication to chloroform administration. As persistence or hypertrophy of the thymus is often difficult to determine by percussion—for enlarged mediastinal glands may give rise to the same note—the presence of the hypertrophied lingual tonsil may be taken as a certain indication of the presence of the former. In addition any hypertrophy of the other lymphatic structures of the oropharynx should be noted. Such examination should always be made before chloroform anesthesia.

Deformities Resulting from Fractures.—The treatment of fractures, and of deformities arising from fractures, has recently been conceived in a more liberal spirit than heretofore. This has resulted from three chief causes, namely, (1) the freedom and enterprise conferred on surgery by antiseptic methods; (2) the proved value of early muscular movements and massage; (3) the Roentgen rays. In discussing the chief factors that singly or in combination form the substratum for pathological conditions, J. J. CLARKE (*Med. Press & Circular*, Feb. 26, 1902) gathers them under the following heads: (1) *Psychical impression.* Just as in minor wounds one naturally protects and guards the extremities without just reason or cause, after major injuries patients are apt to continue to nurse their disability, even though the lesion may have vanished. (2) *Fibrous adhesions.* These are the result of the organization of blood-clots either among muscle or within a joint in the neighborhood of a fracture; they constitute the primary indications for early massage and early passive movements. Massage helps by the relief of pain and spasm. Bivalve splints are of the utmost importance to enable the introduction of such treatment. (3) *Muscular contractures.* These are due to prolonged maintenance of incorrect postures. Their cure is often effected by massage and passive movements, but in some cases tenotomy may be required. (4) *Angular deformity from faulty union.* There is less excuse for this condition than formerly existed, because a radiograph taken through the splints will always clear up any doubts in the surgeon's mind as to juxtaposition of fragments. Although many devices have been produced for mechanically holding the bones in place, there is probably nothing better than

stout silver wire, annealed by being passed through a flame and allowed to cool slowly. Osteoclasis or osteotomy may be called for and these are almost invariably singularly free from subsequent pain. (5) *Shortening from overlapping of fragments.* Illustrative cases of any success in treatment of this class of deformity will be of unusual interest. Here extensive myotomies, fasciotomies and tenotomies may be necessary. (6) *Pseudo-arthritis.* There is nothing new regarding the treatment of this type. (7) *Exuberant callus.* This is most commonly found in fracture of the radius above the attachment of the pronator radii teres. Gighli's wire saw is in many cases the best instrument. (8) *Separated epiphysis.* As this occurs frequently in young children the Roentgen rays are of little help, no image of the cartilaginous epiphyses being given in the radiograph. It is better, if possible, to avoid wiring in these cases, owing to the fact that the foreign body in the bone often interferes with future growth; furthermore, the softness of the bone renders such ligation very difficult. (9) *Fractures in the neighborhood of joints.* These are frequently complicated by dislocation and in case the ordinary means fail, we should certainly follow the advice of McBurney in wiring the fragments. (10) *Fractures involving joints.* The two most common are fracture of the patella and of the acromion; although the technic of these operations is not difficult, they should not be undertaken without a certain regard to the constitution or condition of the individual case. In gouty individuals there is some form of rarefying osteitis which often interferes seriously with success; furthermore, these cases do not take an anesthetic kindly. In operating upon the elbow it is convenient to open the joint from behind by chiseling through the base of the olecranon. This gives a particularly good view of the radial head and is the operation to be recommended for its removal; the olecranon is subsequently wired back in place. (11) *Ischemic contracture.* This troublesome deformity may exist alone or may complicate other deformities. It is commonest after fractures of the humerus. In the absence of other elements it can be alleviated by tendon elongation of all the flexor tendons above the wrist. This, however, is a difficult procedure and should never be undertaken until every other form of treatment has been exhausted. If an attempt be made to remedy the deformity by removing parts of the radius and ulna an ununited fracture is the result.

NEUROLOGY AND PSYCHIATRY.

Adiposis Dolorosa.—Only twenty-six cases of this rare disease have thus far been reported, of which all but three were described as found in women. Two additional cases are reported by F. X. DERCUM (*Phil. Med. Jour.*, March 1, 1902) which present some interesting complications. Both were of the localized diffused form of the disease, the preponderance of fat in the male patient being found on the trunk, in the female on the thighs. While fatty deposits and pain are the two most prominent symptoms usually described, the author lays equal stress on the marked asthenia and psychic or general nervous symptoms. The asthenia does not appear to depend directly on the fatty deposit, for in the woman a few simple movements of the arms brought on excessive fatigue, although very little fat was developed there. A similar condition was present in the man. In addition to the usual neurasthenic disturbance, epilepsy of the grand mal type and preceded by a gastric aura was present in the male patient. Interesting eye phenomena were noted in both cases. In the man, accumulations of fat could be felt in the orbital cavity, and if the eyes were tested separately, moderate dilatation of the pupil in accommo-

dation was noted instead of contraction. In one eye of the woman was noted a circinate retinitis—a mass of partly fibrinous and hemorrhagic exudate in the center of the retina surrounded by crescents of fatty degeneration in Müller's fibers. As the patient was considerably younger than the age at which the latter conditions are usually found, the retinal changes were probably dependent on the same pathological cause.

Progressive Saturnine Paralysis.—Discussing the nervous manifestations of chronic lead poisoning, G. BAZZICALUPA (*Gazz. degli Osped.*, Feb. 9, 1902) calls attention to the cerebrospinal syndrome represented by progressive paralysis. Analysis of an individual case, in which all etiological factors other than inherited neuropathic tendency and chronic lead-poisoning could be excluded, is used as the basis of an argument tending to establish the identity of saturnine progressive paralysis with dementia paralytica due to other morbid causes. The clinical picture duplicates that of the latter disease in its various stages; anamnestic data and certain concomitant symptoms characteristic of saturnism giving the key to causation of the malady. In view of the facility with which chronic lead-poisoning can be induced through canned food, occupation, etc., the author holds that saturnism should be considered as a possible etiological factor in all cases of progressive paralysis.

Intermittent Limping Due to Obliterating Arteritis.—A peculiar case is reported by C. L. DANA (*Med. Rec.*, Feb. 22, 1902) in which the patient, while walking was suddenly seized with pain, stiffness and weakness in the left foot. Disagreeable sensory disturbances were also present and the pulsations in the popliteal and plantar arteries could not be felt. Subsequent attacks followed and similar signs were later present in the left arm. Several instances of such cases have been reported and are due to arterial sclerosis, causing obliteration of the smaller trunks, also to disease such as aneurism of the larger arteries. The condition is chronic in course and may lead to gangrene or symptoms resembling erythromelalgia or Raynaud's disease. It affects usually one leg, but may attack both and may affect the arm. It occurs in middle-aged people of neurotic temperament and is associated with exposure, alcoholism, gout, diabetes, excessive use of tobacco, and with syphilis.

Cerebral Syphilis Simulating General Paresis.—In this case, reported by E. BRISAUD and A. PÉCHIN (*Le Progrès Méd.*, Jan. 18, 1902), the symptoms were rather marked, and there were too many isolated phenomena to indicate positively a diffuse periencephalitis. There were epileptiform convulsions of Jacksonian type, motor aphasia, hallucinations of hearing, right facial paralysis, paralysis of the right arm and right hemianopsia. These all disappeared very promptly under intramuscular injections of oil containing biniodide, so that the patient felt and appeared as well and capable as he had ever been.

Scleroderma.—This condition has usually been considered due to disease of the trophic centers in various parts of the nervous system, not only spinal, but also cerebral and bulbar. B. SACHS (*Phil. Med. Jour.*, Feb. 8, 1902) advances the suggestion that some functional or organic, or perhaps toxic condition of the system influences these centers. In a like manner whether or not nerve influences be at work, the cause of myxedema is at present attributed to deficient thyroid action. Without claiming any analogy the author directs attention to the resemblance of symptoms between myxedema and the scleroderma and reports on the favorable action of the administration of thyroid gland in the latter condition. He gave the thyroid gland in five well-marked cases in doses of from two to six grains

t. i. d. The effects varied and seemed least marked in cases in which the scleroderma appeared to be of neural origin. It was found necessary to increase the dosage until some improvement was noted and then the thyroid could be continued in smaller amounts. One patient was apparently entirely cured, but had to take the drug constantly to prevent recurrence of the symptoms; the others showed improvement in the greater pliability of the skin and in freedom from scaling. A more careful trial is urgently advocated.

Resection of the Sympathetic for Trigeminal Neuralgia.—This operation has effected a cure in eight cases so treated by its originator, G. CAVAZZANI (*Gazz. degli Osped.*, Jan. 26, 1902), the last case being the subject of this paper. The point of resection was the superior cervical ganglion, and the relief experienced is believed to be due to modification in the nutrition of the Gasserian ganglion by resection of the filaments which connect it with the sympathetic. In none of the cases, whether operation was limited to one ganglion or included a larger portion of the cervical sympathetic chain, were there permanent ill-effects due to destruction of the sympathetic function. The author believes that the success of this method in his personal experience, as well as in the hands of other surgeons, should place it among the classical operations for trigeminal neuralgia.

Sympathectomy in Basedow's Disease.—Animal experimentation has shown that exophthalmos may be induced by irritation of the superior ganglion of the cervical sympathetic; hypertrophy of the thyroid has been attributed to the influence of the middle cervical ganglion. Working upon the theory that Basedow's disease is due to irritation of the cervical sympathetic, D. C. BALLARIN and D. C. J. MUNOZ (*Rev. d. Med. y Cir. Pract.*, Feb. 7, 1902) performed bilateral sympathectomy in a case exhibiting typical symptoms of exophthalmic goiter. The patient is said to have recovered from the operation within fifteen days; convalescence being perfectly uneventful. At the present time, four months after the operation, there is marked decrease in exophthalmos, the eyelids now covering the eyes in sleep, whereas formerly they were widely open, palpitations have ceased, and the pulse has been reduced from 150 to 110 per minute.

Psychoses among Jews.—It is remarkable that all but one of the cases of amaurotic family idiocy so far reported have occurred in Jewish children. Impressed by the large proportion of Jews among his cases of periodical insanity, PILCZ (*Ann. Medico-psychologiques*, Jan.-Feb., 1902) was led to take up the study of mental diseases among Jews in general. From a review of the literature he cites the following: Kraepelin states that the Jews are more prone to mental and nervous diseases than are the Germans, explaining this fact as being probably due to the greater frequency of consanguineous marriages among the former, this view being concurred in by Kirchhoff and Krafft-Ebing. Hirshl found 20 Jews among 100 cases of paralysis. Beadles found a large and abnormal proportion of Jews among his cases of general paralysis (31 per cent.), these figures relating only to males, no difference in this respect being found among females. From his own observation of the cases in the psychiatric clinic at Vienna, Pilcz cites the following statistics: Among 1,219 cases submitted 134 were Jews, a proportion of 10.9 per cent. The Jews form 8.8 per cent. of the general population of Vienna. These figures prove the excessive proportion of Jews among psychiatric patients, at least so far as Vienna is concerned. Although alcoholism formed the larger proportion of all the cases, reaching the number of 173, not a single case was found among Jews. These also form no pre-

ponderance in cases of dementia, although in dementia secondary to acute psychoses a marked preponderance was found in Jewesses, while in precocious dementia Jews furnished an excessive proportion of cases. From these facts he draws the conclusion that so far as the psychoses incipient at an early age are concerned Jews are in greater danger of becoming demented than are people of other races. Few Jews are observed among cases of moral insanity. All the psychoses of which Jews show the largest proportion of cases are those in which the congenital psychopathic constitution, the so-called "heredito-degenerative" type, forms the principal etiological factor. The large proportion of cases of progressive general paralysis found in Jews leads the author to speculate that the "struggle for existence" among this nationality is the principal etiological factor. There was no difference to be observed between Jews and other people in cases in which the etiology includes causes such as hetero and auto-intoxications, vessel changes, and cerebral lesions.

Relation of Syphilis to Diseases of the Spinal Cord.—In a study of this subject R. V. F. MOHEDANO (Rev. d. Esp. Med., Year V., No. 63, 1902) reaches the following conclusions: That which gives syphilis a special character as an etiological factor is its indefinite duration, causing it to act not only through the production of local lesions, but as a chronic intoxication. (2) Syphilis may attack any of the organs, but it shows marked predilection for the nervous system. (3) It is not possible through pathological anatomy, symptomatology or time of appearance to separate precisely syphilitic diseases from those known as parasymphilitic. (4) Not all cases of myelitis in individuals who have suffered from syphilis are necessarily of syphilitic origin; neither does the existence of syphilis preclude the possibility of other causes acting. (5) Syphilitic myelitis may appear at any time after infection. (6) The gravity of the infection does not always bear direct relation to the frequency and gravity of medullary affections. (7) The only lesion which can be considered characteristic of syphilitic myelitis is gummatous infiltration, either circumscribed or diffuse. (8) Syphilis may affect simultaneously or successively various parts of the central nervous system. (9) Medullary lesions rarely remain limited, the meninges almost always becoming involved. (10) Medullary syphilis does not present any special symptomatic picture, but may give rise to any medullary syndrome. (11) The diagnosis is based mainly upon a syphilitic history. (12) Syphilis is the most frequent though not the only cause of tabes; there is nothing to justify the belief that ataxia is always of syphilitic origin. (13) The syphilitic nature of an affection should not be judged by the effects of antisymphilitic treatment.

PATHOLOGY AND BACTERIOLOGY.

Snake Venom and the Blood.—A research has just appeared from the Laboratory of the University of Pennsylvania upon "Snake Venom in Relation to Hemolysis, Bacteriolysis, and Toxicity" (FLEXNER and NOGUCHI, Univ. of Penna. Med. Bull., Feb., 1902) which promises to be of fundamental importance in its therapeutical applications. By hemolysis is meant the solution of the corpuscles, including erythrocytes and leucocytes of the blood. Such solution is produced by certain inorganic substances and also by various complex agents derived from living plants and animals. Of all such agents, the most active are found in the blood of alien animal species; others are the products of cellular activity, such as venom, and certain toxic products of bacterial growth, as tetanolysin, etc.; still others are yielded by some of the higher plants, as "croton." After admixture of the corpuscles of the blood

with any of these agents, the former first run together, or become "agglutinated"; secondarily, they are dissolved and destroyed. These phenomena of agglutination and of lysis, as seen in the blood, have their counterpart in the actions of certain sera upon bacteria as evidenced by the Widal reaction with typhoid bacilli and by the Pfeiffer phenomenon with cholera spirilla. It has recently become possible not only to demonstrate the fundamental similarity of bacteriolysis and of hemolysis, but to provide a chemical explanation of the processes involved. The agglutinating principle, briefly described as "agglutinin," is distinct from the dissolving one. The latter contains two substances, of which one is stable and is the product of immunization—the intermediary body; the other, which is very unstable, is normally present in the body juices and is known as the complement. The union of the intermediary body with the cells (bacterial, blood-cells, etc.) makes it possible for the complement to come into action and produce solution. It is upon the foregoing facts that the experiments of Flexner with various kinds of venom and various species of sera were based. He showed first that the venoms were capable of producing both agglutination and solution of blood-corpuscles. Marked differences in susceptibility to agglutination were observed in comparing various species of animals, and the agglutinating and the lytic powers of the venom were found to be distinct and separable factors. In the experiments directed toward determining its hemolytic powers, it was found to contain several intermediary bodies, each of which was given up in succession when brought into contact with different species of blood-corpuscles. These intermediary bodies showed special affinities, then, for the complements contained in the blood of the respective animals, and lysis resulted. It was found that the agglutinating principle is identical for red and white cells, but that the dissolving principle for leucocytes is distinct from that for the red cells. The most important part of the research was directed toward determining the effects of venom upon the bactericidal properties of blood-serum. The bacteria used were *B. typhi*, *B. coli*, and *B. anthracis*. It was found that all the venoms experimented with, when used in sufficient quantities, destroyed the bactericidal properties of many normal blood-sera. The manner of the destruction consists in the fixation of the serum-complements by the venoms. Upon the intermediary bodies of serum, the venoms have no action. If, therefore, the venom is incapable of uniting with the complement, as in *Necturus*, the original bactericidal properties remain unaffected by the presence of the venom. Calmette's antivenom was tested, with regard to its restraining action upon venom-hemolysis and venom anti-bacteriolysis. The substance was found to neutralize venom, and to remove both the hemolytic and the anti-bacteriolytic actions therefrom.

Decomposition of Albuminoid Substances in Excessive Fatigue.—The effect of overfatigue upon the body has been considered from various standpoints; A. MOSSO demonstrated a poison in the blood of dogs after exhaustive fatigue. C. JACKSON (Arch. Ital. d. Biol., Tome xxxvi., Fasc. 3, 190) has studied the effect of overwork upon the urine. Before and after an extended walking tour, the urine of five men, ranging from seventeen to sixty-two years of age, was examined. The most noticeable effect of exhaustion from the journey was a marked increase in the elimination of nitrogen in every case. It is known that a great part of the nitrogen from food ingested is eliminated in the form of urea, this later increasing with nutrition. The nitrogenous increase in the specimens examined could not, however, be attributed to increased nourishment as, in one instance, the journey was made prac-

tically fasting, urea being reduced one-half in consequence. The hypothesis is advanced that excessive fatigue is a pathological condition in which the substances eliminated by the body are not only increased, but changed in such a way as to indicate dissolution of tissue, probably muscular.

Effect of Splenectomy upon the Bile.—An interesting study of this subject through animal experimentation is reported by A. PUGLIESE (Bull. delle Scienze Med., Year lxxii, Series viii, Vol. 1), the conclusions reached being that the influence of splenic enucleation upon the quantity of bile secreted is not marked, neither does splenectomy modify to any extent the elaboration by the hepatic cells of biliary acids. The most noticeable effect of excision of the spleen was diminution in the coloring matter of the bile, the author deducing from this fact that an important function of that organ is to accumulate and pass on to the liver, through the portal vein, such material as is necessary to the formation of biliary pigment by the hepatic cells. After removal of the spleen, this material is distributed to other parts of the body, and only reaches the liver in small quantities through the general circulation; hence the diminished elimination of biliary pigment.

Agglutination of Malarial Blood.—This subject is again discussed by D. LOMONACO and L. PANICHI (La Riforma Medica, Feb. 12 and 13, 1902), who give the outcome of recent experiments as follows: The serum of malarial subjects gives the same reaction as the blood, conditions of success being that the specimen be obtained by Widal's method of serum diagnosis, i. e., by means of a capillary tube applied to the punctured finger, the serum being allowed to separate naturally, as it does upon standing a few hours, and that the mixture with the normal blood be made drop by drop. If a healthy individual be subjected to blood-letting and the serum separated by centrifuge, agglutination always occurs even if the red cells of the same individual be added. Agglutination is never obtained with the normal specimen when Widal's method is used. In the opinion of the authors, variations in technic account for the fact that the diagnostic value of the agglutination phenomenon has been questioned. It is further observed that quinine does not affect agglutination of normal specimens improperly treated and that in the blood of patients suffering from other infections, whether associated with malaria or not, agglutination persists *in vitro* even when the serum is diluted with strong solutions of quinine. The writers sum up as follows: (1) The blood or serum of a healthy subject mixed with the blood of another healthy subject is non-agglutinating. (2) The serum of a healthy individual acquires agglutinating power if obtained in such manner as to injure the red cells. (3) Addition to malarial blood or serum of an equal volume of an isotonic solution of sodium chloride, containing 1 per cent. of quinine, causes disappearance of the agglutinating phenomenon. (4) This property serves to determine the malarial nature of a given specimen. (5) In malarial serum or blood, so treated, persistence of the agglutination phenomenon indicates the presence of some other infectious process. A further series of experiments was carried out for the purpose of differentiating between agglutination of malarial blood and that of blood in other diseases. For this purpose the blood was diluted with the physiological solution, the degree of dilution causing disappearance of agglutination in each specimen to be noted. In most instances agglutinating power was destroyed after dilution of 1:1; in a few cases typhoid blood showed agglutination after dilution of 1:3 or 1:4. The highest agglutinating power was shown in malarial blood, the phenomenon being observed invariably in dilutions over 1:5. Hence

it is concluded that specimens which retain their agglutinating power in dilutions over 1:5 may be considered as malarial.

GENITO-URINARY AND SKIN.

Treatment of Chronic Eczema.—There is no rational therapy of this distressing disorder which does not take into very careful consideration its undoubted staphylococcic origin. While we are not yet in a position to produce proof positive that germs are the causative factor in every case it is at least significant that treatment directed toward destroying germ life in the most potent of cure in the worst and most chronic cases. A. ENOWNS (Brit. Med. Jour., Feb. 15, 1902), after dwelling on the very great importance of first carbolizing the skin before applying Unna's zinc gelatin, gives a sort of *ode-mecum* series of pertinent remarks touching on the general principles of treatment. "Is a patch of eczema chronic and dry, we must moisten and grease it. If too wet, we must dry it. If swollen, we must raise and support it; if hot, we must cool it; if painful, we must soothe it; if due primarily to microbes, we must kill or check them. If there be great-cell infiltration, we must excite absorption; if dead scales cover the surfaces and prevent our medicines from acting, we must remove them; if the part is being irritated in any way, it must be protected or all treatment will fail." It is very difficult to draw anything like a sharp distinction between chronic and acute eczema. Granted that the symptoms are due to infection, the treatment in the acute condition will not vary much from that of chronic stages. It must not be forgotten, however, that there are in many cases associated causes and complications, such as constipation, dyspepsia, gout, tubercle, urticaria, syphilis, and that the case may be gravely aggravated by sunlight, heat, cold winds, wet, plants, discharges of one kind or another, and scabies. The internal remedies may be summed up as follows: Gray powder, calomel, aloes, citrates and carbonates, iron, quinine, strychnine, occasionally colchicum, and still more rarely arsenic—these will be all one needs. In many cases the diet is all-important. This is particularly true of children; often the addition of meat-juice or cod-liver oil will work wonders and frequently thyroid extract is all that is required. In fine, then, in all cases the parts should be carbolized before Unna's paste or any other protective is applied; generally the accompanying constitutional treatment should be decided upon almost exclusively by the history of the case.

Operations upon the Prostate.—In order that the best results may be obtained from operations upon enlarged prostates, it is necessary to understand the particular indications which each operation meets, for it is impossible to cure or even improve every case by a particular routine method. The five different procedures at present in favor with the profession, according to E. H. FENWICK (Practitioner, Feb., 1902), are: (1) resection of one or both vasa deferentia; (2) removal of one or both testes (orchidectomy); (3) division of the prostate at the urethral opening through perineal section; (4) division of prostate by an electrocautery knife passed along the urethra (Bottini); (5) removal or enucleation of obstructing parts of prostate by perineal or suprapubic section. Each one of these operations has its particular effect and hence it is necessary to first find out the shape, size and form of the obstructing organ. The result of a vasectomy is similar to that of an orchidectomy, but very much less pronounced. The prostatic lobes in health correspond in functional activity with the testes, and hence abrogation of the function of the latter causes a shrinking of the prostate, but it is not general atrophy as many suppose. The prostatic lobe corresponding to an absent testicle usually

becomes broader and flatter than the other, the lobe becomes firmer and when both testicles are removed the sulcus between the prostatic lobes becomes deeper, corresponding to an atrophy of the verumontanum and structures around the urethra, the function of which depends upon the preservation of the sexual act. The median lobe is seldom affected by this procedure. In the median lobe group of cases the hypertrophy may be due to fibrous or adenomatous growths, but in either case a suprapubic cystotomy is usually the best method, and in the adenomatous variety the growth can be easily shelled out. In the fibrous variety the lobe must be removed preferably by the flap operation. There is a group of cases in which the only obstruction is in the form of a projecting bar or collar at the orifice of the urethra, the canal being otherwise free. The gland is only moderately enlarged, but very firm or even hard. The interlobar fissure is very slight or filled up by a ridge of fibrous tissue which denotes an "iron-bound" gland unsuited for perineal or suprapubic enucleation. A beginning hard cancer of the prostate is sometimes mistaken for a gland of this variety. These dense prostates are best treated by a median perineal section, dividing the fibrous collar, up to the neck of the bladder. In the adenomatous variety rectal examination shows a huge elastic prostate projecting backward, with a sulcus almost obliterated to a line by intraprostatic tension, and in addition a distorted lengthened prostatic urethra. Enucleation is distinctly indicated in these cases and can usually be easily done either by the perineal or by the suprapubic route, the latter being preferred by most surgeons, unless the patient is very weak. Only about 50 per cent. of prostates are of this nature, however, and hence enucleation can be performed in only about one-half of the cases. In short, there are two essential groups of general enlargement of the prostate—the small, tough, flat, unshellable prostate, which generally has a filled-up sulcus, and the large, soft, elastic, projecting, shellable prostate, which has a fine line of sulcus.

Perineal Prostatectomy.—An operation which avoids injury to the bladder and is applicable to all forms of prostatic enlargement is proposed by A. H. FERGUSON (Jour. Amer. Med. Assoc., Feb. 22, 1902) who reports good results in six cases. The prostate is exposed by a median perineal incision and the capsule is opened transversely. The gland is enucleated with the finger and removed piecemeal by special forceps, no effort being made to save the posterior portion of the prostatic urethra. A gauze-covered drainage-tube is introduced into the bladder, after the latter has been flushed out, and is allowed to project from the partially-sutured perineal wound. The author claims that this method affords the most direct route to the prostate and avoids injury of the bladder or surrounding parts. By working within the capsule hemorrhage is avoided. Perineal drainage is more complete and danger from septicemia is not as prominent as in the suprapubic operation. Uremia is less likely on account of the short anesthesia and there is less accompanying shock.

Treatment of Gonorrhea.—The treatment of gonorrhea has recently been subjected to such an upheaval, especially by Guyon and his school, that general practitioners are apt to ask themselves whether they are really up-to-date with their older and less radical methods of cure. The entire question has been reviewed with much fairness and sanity by HEATON (Birmingham Med. Rev., Feb., 1902), who has had a wide experience. As regards acute gonorrhea, he condemns the so-called abortive treatment by means of the injection of a solution of nitrate of silver of gr. xv. or xx. to ʒi . The disease frequently fails to abort within the promised fourteen days. In fact, the gon-

orrhea often pursues its course unchecked, or the acute symptoms may even be accelerated and intensified. Moreover, there is risk of urethral and of periurethral abscesses, and of secondary strictures. Systematic treatment and very frequent irrigations of the anterior urethra during the early stages with mild antiseptics are also discarded as too tedious and laborious. The general treatment in acute cases is of great importance. In so far as possible, absolute physical rest should be enjoined. The patient should be kept on a reasonably low diet and fluids should be given in considerable quantity. Hot hip-baths are of great service. Both penis and scrotum are to be supported by bandages. Free exit must be given to the urethral secretions, and the glans penis must be bathed at least twice daily to keep it clean. The drug treatment is symptomatic in the early stages. The oleoresins at this stage only do harm. A brisk purge to relieve the bowels, aconite if constitutional disturbance be prominent, alkalies and hyoscyamus to soothe the mucous membrane of the urethra, will fulfil most of the requirements. When the discharge is profuse, some very mild antiseptic mixed with an anodyne is to be used as an injection to wash out the inflamed canal; one to two drams of the fluid are to be injected, without the use of any force, and to be retained for one or two minutes. As the acute stage subsides and during the whole of the stage of gleet the various oleoresins form the sheet anchor as internal medicines. Sandal-wood is the most efficacious and least likely to disturb digestion; it is best given in capsules. Cubebs is especially useful in the more chronic cases. At the same stage of the disease, which is marked by a comparative thinness of the discharge and by a decrease in the ardor urinae, the local treatment is altered. Astringent solutions are now indicated. The most useful of these is permanganate of zinc in a strength of gr. $\frac{1}{6}$, increased to gr. $\frac{1}{2}$, to ʒi . The other sulphates, also protargol, are likewise valuable. The great majority of cases of acute gonorrhea may be cured by these means within from four to five weeks. Those which persist and those which reach the practitioner after years of neglect fall into the category of chronic gleet and require an absolutely different plan of treatment. The persistence of the disease may be due either to trouble within the anterior urethra, such as an unhealthy condition of its entire mucosa, or a slight stricture with ulceration behind it, or "granular patches," or to trouble posteriorly, such as inflammation or abscess of the deep lacunae or ducts, or chronic inflammation of the prostate. The use of the cold metal bougie often exerts a marked beneficial effect upon the chronically-inflamed anterior urethra. Local patches are diagnosed by the use of the endoscope, and are treated by direct applications of strong solutions of silver nitrate, gr. xv. or xxx. to ʒi , or protargol, 5 to 20 per cent., made twice or three times weekly. If the trouble lie in the posterior urethra or in the prostate, it is very likely to prove extremely obstinate. The use of the cold metal sound, the daily use of medicated urethral bougies introduced into the deeper portion of the urethra, the instillation of a few drops of some strong astringent by means of a special deep syringe, the daily use of large quantities of some mild astringent introduced under pressure—all these are measures which must be successively and patiently tried, perhaps only to fail.

THERAPEUTICS.

Quinine as a Dressing.—Quinine has been used in lotion for various diseases, but combined with cod-liver oil externally it seems to be a new remedy, according to J. READ (Lancet, Feb. 15, 1902). He employs it with good results, one dram of quinine to eight

ounces of cod-liver oil, to be shaken well before being used, in tertiary and rheumatic ulcers of the leg and for ordinary ulcers, gangrene of the skin, burns in which large surfaces have sloughed away, and other allied conditions. All wounds take on a healthy and kindly action and pus from the surface smells sweet and contains a limited number of germs. There is nothing to recommend the preparation in the way of cheapness or odor, but it has the advantage of supplying a weakened system with an oily food and a tonic drug. For intertrigo its effects are good, if not too long continued. For eczema it does not act well, unless at the same time gastric troubles are corrected.

Injection Treatment of Tuberculosis.—The intravenous injection of sodium cinnamate in the treatment of tuberculosis is again receiving considerable attention. The method is usually only applicable to early cases, and in the words of its originator, Landerer, the whole process may be summed up by saying that the treatment substitutes, by the resulting marked leucocytosis, an active aseptic inflammation for an inactive one and the issue is rapid cicatrization. A. MANN (Phil. Med. Jour., Mch. 1, 1902) submits a report on the progress of cases formerly treated and gives the results of further experience. Of ten cases, two mild ones are apparently entirely cured, and of the other rather severer ones only one (with tuberculous laryngitis) is hopeless, the others all holding their own and even showing some improvement. Seven new cases are reported, four patients, with moderate involvement of the apices, showed an almost entire absence of physical signs and marked gain in weight and condition. Another in whom the process had been present for twenty years, with signs of a large cavity showed unmistakable improvement, with diminution of symptoms, although the cavity has persisted. A patient with infiltration of both lungs, numerous hemorrhages, etc., had an intercurrent attack of smallpox during the treatment, which, judging from the sudden amelioration of symptoms, may have destroyed the virulence of the tuberculous poison. A final case with extensive tuberculous lymphadenitis showed great improvement after two months' treatment. It is to be noted that although the climatic conditions (Denver) may have had a favorable influence, the improvement continued after patients had returned to their homes.

Milk Alimentation in Adults.—Most ancient of all known foods and remedies, milk has in the past thirty years become more and more the regimen of invalids according to the wide testimony of our hospitals. R. LEPINE (La Sem. Méd., Feb. 19, 1902), in discussing the practicability of using it in the adult, turns first to a discussion of its composition. Per thousand grams it yields from 110 to 135 grams of dry material. The fat varies according to the animal from which it is drawn; under certain conditions of favorable feeding it may reach 70 grams, goat's milk is much higher than this. Lactose, which in the intestine breaks up into glucose and galactose, averages from 37 to 55 grams per liter. It is noticeable that milk is particularly rich in phosphorus; this varies from 25 to 55 grams per liter. Aside from these well-known constituents there are one or more ferments capable of an automodifying action which affect the caseine to a very considerable extent. Citric acid is another factor not to be classed among the ordinarily recognized ingredients. Can milk, in its purest form, be considered suitable food for an adult? Surely not, for the adult stomach under normal conditions will not digest it as well as the stomach of an infant. The non-absorption, however, of a notable fraction of the albuminoids and of the fat of milk is not its only defect; the lack of stimulation

to the nervous system is a more important factor. "Life," said an old master, "is entirely dependent upon excitement." If this proposition were exactly true, milk could not sustain life. These are some of the defects in milk; happily, however, they are no serious disadvantage in its use in certain diseases. Among the more important of these should be named the disorders of the digestive tract, particularly round ulcers of the stomach, albeit there are certain conditions of the rectum in which milk alimentation gives as good results as in gastric ulcer. In many of the diseases of the liver, milk is admirable, particularly in the treatment of catarrhal jaundice, in which it is said by some to be almost curative. In Bright's disease, because it gives rise to but few toxins and because of its great diuretic power, it is of perhaps greater value than in any other disease. In febrile disorders, it has long constituted the chief food. Depending upon the fact that it nourishes without exciting, milk has an admirable use in many nervous diseases. In diabetes, if one believes Dongkin, who places his patients upon an exclusive diet of skimmed milk and gets good results, it would seem to be indicated, but since each liter of milk gives only 650 calories of heat, 6 liters, which is the amount prescribed by him, must yield 2,400, which is altogether too little for a diabetic. It is probable that the good results noted in these cases are only apparent.

EYE, EAR, NOSE, AND THROAT.

Chronic Progressive Deafness.—This form of deafness occurs quite insidiously without warning, pain or discomfort, and is apparent to the individual only after a marked impairment of hearing has taken place. In contradistinction to deafness which is secondary to the diseases of the ear, M. COLLIER (Medical Press & Circular, Feb. 5, 1902) calls this chronic progressive deafness. The etiology of this affection, like that of most of the affections of the upper respiratory tract, requires for its understanding knowledge of the laws of physics and pneumatics. It is too often found that ordinary writers through ignorance of the subject really deny that the tension of the air in the cavity of the ear must be the same as that of the outside ear in order to insure a free and normal vibration of the drumhead. It is also erroneously contended that obstruction to the free inlet of air to the tympanic cavity produces no difference in the tension of the air within that cavity. Many consider new the theory that if the normal extravascular pressure be diminished in the tympanic cavity the intravascular pressure will assert itself by dilating the tissues and vessels generally under the lessened pressure. An important point which the author makes is that the tympanic cavity is a part of the nose, both anatomically and developmentally. Affections of the nose and the tympanum have a close affinity. Both the tympanic cavity and the other cavities leading from the nose are anatomical parts of and extensions from the nose cavity and any alterations in the physical condition of the bones of the nose cavity will be communicated to and affect the patent extensions from this cavity. Under normal circumstances the contents of each cavity have a free intercommunication. The tension of the air within the nose is the same as the tension of the air within the tympanic cavity and both are the same as that of the air in the surrounding atmosphere. The tubotympanic cavity is a part of the upper air-passages as much as is the antrum or any of the accessory cavities of the nose. It is lined with an extension of the same membrane that lines the nose and is covered with the same sort of ciliated epithelium, but differs in this one respect, that it partakes of the character of, and is virtually, a periosteum. This dif-

ference in the constitution of the lining of the tubo-tympanic cavity greatly increases its importance both physiologically and pathologically. This anatomical continuity between these cavities is the ground upon which all the other causes of middle-ear disease rest. These are so well known as not to need enumeration, and it is necessary to add only that all conditions of the nose and the other accessory cavities of it have a direct bearing upon this form of deafness. The treatment therefore consists in removing at an early date all chronic conditions of the nose and its appendages, in the effort to cure or to prevent chronic progressive deafness.

Eye Defects and Mental Dulness.—By far the most frequent defects of the eye which may cause apparent mental dulness and deficiency in children, writes C. S. BULL (Pediatrics, Feb. 15, 1902), are anomalies of refraction. In the order of frequency, though not of importance, these are hypermetropia, astigmatism and myopia. The subject of the first may be dull and stupid, because the eye-strain renders him incapable of any sustained mental effort. Astigmatism may lead to a train of reflexes such as will handicap a child seriously. The myopic child may not see the blackboard, the maps on the wall, or what is going on in the playground unless he is close by, and his companions jeer at him for his stupidity. This makes him self-conscious and perhaps perverted in his tastes. Insufficiencies of the ocular muscles causing squint produce headache, eyache and mental confusion, and by application to work these become so marked and constant that the child is no longer capable of continuous mental effort. These children are often unjustly punished for backwardness. The rarer ocular defects causing mental deficiency are congenital cataract, dislocation of the lens, absence of pigment in the uveal tract, especially the iris, coloboma and aniridia. This last exposes the eye to too much light. There is also a congenital want of visual memory, nine cases of which have been recently reported, due to an organic deficiency in the part of the brain where the visual impressions of letters, etc., are registered. These children are quite unable to learn to read.

THERAPEUTIC HINTS.

Rheumatism in Children.—The following is well borne by the stomach, the bitter taste disguising the unpleasant sweetness of the salicylate:

R Sodii salicylatis gm. 4.0 (3i)
Liq. potassii citratis 60.0 (3ij)
Tinct. cardamon. comp. ad 90.0 (3iij)

M. Sig. Two teaspoonfuls every two hours for a child five years old.

A useful external application to the joints is:

R Ol. gaulther c.c. 30.0 (3i)
Alcohol 15.0 (3ss)
Lin. chloroformis ad 120.0 (3iv)

M. Sig. Apply externally on cotton.—W. M. POWELL in Diseases of Children.

Nutrient Enema.—A nutrient enema frequently employed at St. Luke's Hospital is:

R Yolk of one egg.
Beef peptonoids c.c. 8.0 (3ij)
Peptonized milk 180.0 (3vi)
Whisky 30.0 (3i)
Sodium chloride a pinch

A stimulating enema is

R Whisky c.c. 15.0 (3ss)
Black coffee 120.0 (3iv)

Gall-stones.—Diet, exercise and diluent beverages combine to favor the disappearance of the stone. As a

rule, too little water is taken in these cases. Alkaline saline waters stimulate peristalsis and increase the flow of blood to the abdomen, the bile-passages being massaged by the former and the diseased mucous membrane benefiting by the latter. These salines do not dissolve the stones, for such allowed to stand two weeks in a 1-per-cent. solution of sodium salicylate, benzoate, phosphate, sulphate, bicarbonate, or chloride, potassium sulphate or ammonium chloride suffered no loss of weight. Allowed to stand in olive oil, however, a gall-stone lost 68 per cent. of its weight in two days and then disintegrated. The solid matter of a stone becomes viscid in a few hours in a 5-per-cent. solution of animal soap. Large doses of oil, probably do not reach the gall-stone directly, but by producing an increased proportion of fat, fatty acid and soap in the bile, cause it to have a solvent action on the cholesterol of the stone. For this method of treatment from two to ten ounces of oil should be given daily, and the results are very questionable. Massage of the gall-bladder would, in many instances, be useless or harmful. During a gall-stone attack relief is urgently demanded. A pint of water taken as hot as possible, with hot fomentations over the liver, may give relief, or c.c. 1.0 (Mxxv) of spiritus etheris in two teaspoonfuls of chloroform-water every quarter of an hour. Exalgine, gm. 0.06 (gr. i), every half-hour for three or four doses is also of service. These failing, morphine must be used.—Mayo Robson in Allbutt's System of Medicine.

General Septic Peritonitis.—Formerly, in these cases, G. E. ARMSTRONG (Montreal Med. Jour., Feb., 1902) withheld opium and endeavored to secure free movements of the bowels. The plan which he has adopted of late, however, is to arrest peristalsis and promote the elimination of poisons by stomach lavage, rectal feeding entirely replacing stomach feeding, and the administration of opium or morphine hypodermically. The use of this latter before surgical intervention should be strongly condemned, because, of course, the initial cause of the peritonitis must be attacked by operation. Stomach lavage promotes better breathing and lessens vomiting and peristalsis. The author also advocates more frequent operation under local anesthesia in these cases.

Uncontrollable Vomiting.—The following treatment is especially adapted to the vomiting of pregnancy, though it may be used in emesis from other causes:

R Cocaine hydrochlorate10 (gr. ij)
Antipyrin 1.00 (gr. xv)
Distilled water 100.00 (3iiss)

Sig. A teaspoonful every half hour.

Or:

R Cocaine hydrochlorate50 (gr. viij)
Distilled water 50.00 (3iss)

Sig. Six drops, repeat in one hour, then in three hours if necessary; after this reduce to three or four drops before meals. For local application by means of tampon to cervix in vomiting of pregnancy or of acute metritis:

Cocaine hydrochlorate 1.00 (gr. xv)
Ext. belladonna25 (gr. iv)
Vaseline 10.00 (3iiss)

Upon the theory that vomiting of pregnancy may be due to general intoxication of the system, Condamine suggests injection, preferably rectal, of artificial serum, three to four liters daily; 300 grams being slowly injected at one time. If peristalsis be excited, the injection should be suspended and resumed later. In cases of great intolerance a few drops of laudanum may be added. For nourishment LUTAUD advises plasmon, beginning with a teaspoonful after each dose of cocaine.—Jour. d. Med. d. Paris, Feb. 23, 1902.

THE MEDICAL NEWS.

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THE EVOLUTION OF TYPHOID NOSOLOGY.

TIME was, and not so many years ago, when typhoid fever was considered to be a febrile disease the specific anatomical basis of which was an ulceration of the intestines. The systemic symptoms of the disease were looked upon as due to the absorption of toxic materials from the bowels. At first these toxic materials were thought to owe their origin to chemical substances produced by the breaking down of the intestinal ulcers, hence the apathetic state of the patient during the third week of the disease when the ulcerative process reached its climax. Later came the idea that toxic substances which caused the general symptoms were produced during the growth of the specific bacteria of the disease. In recent years as the result mainly of bacteriological investigations there has come the realization that the pathologico-anatomical basis of the disease is most frequently, though by no means necessarily, located in the intestines. Extra-intestinal typhoid fever is no longer a theory, but a demonstrated fact. The biliary tract, the lungs and the meninges are especially liable to invasion by typhoid bacilli, and the bacilli may fail to affect any other tissues except these. Bacteriological investigations and especially of late the Widal reaction have demonstrated that many anomalous febrile

conditions utterly unsuspected before of being typhoid in origin are really due to the presence of the bacillus of Eberth.

For many years it was thought that typhoid fever was rare in children under five years of age. Some ten years ago a distinguished specialist in children's diseases insisted that the disease was so rare during these early years as to be justifiably excluded at once when a question of doubtful diagnosis in children's febrile affections was under consideration. The use of the Widal test as shown by the series of cases reported from Mt. Sinai Hospital (see page 588) demonstrates not only that typhoid fever is not rare in children, but that it is quite as frequent during the first five years of life, considering the opportunities for infection at this time, as during any corresponding subsequent period. The most interesting observation with regard to typhoid fever in very young children is that the disease runs, as a rule, an anomalous and often extremely atypical course. It is evident that in most cases its true nature remains unrecognized.

Typhoid fever in the early years may, for instance, simulate lobar pneumonia so completely as to present no symptoms beyond those found in the respiratory tract, symptoms indicative only of a process of pulmonary consolidation which clears up not by crisis, but by lysis, and this is of course not unusual, even in the ordinary pneumonia of children. A classical picture of meningitis may be the result of meningeal invasion by the typhoid bacillus, no symptom pointing to any localization of the bacilli or their products in any other part of the body. The most difficult diagnoses occur, however, in cases of acute intestinal disturbance with more or less continued fever. In these patients the fever is set down as due to intestinal irritation, while its irregularity is supposed to exclude all necessity for thinking of typhoid. During the season of maximal prevalence of typhoid fever many cases presenting symptoms ordinarily quite distinct from this disease will prove if submitted to the Widal test to be true cases of typhoid fever, according to our present knowledge of the disease.

This is also true of certain cases in adults in which there is very little ground for the clinical diagnosis of typhoid fever. On the other hand, certain clinically typical cases of typhoid fail to give the Widal reaction. Dr. Ewing in his important paper on "Serumtherapy in Typhoid Fever" (see page 577) attributes this peculiarity to the fact that not even all the types of clinical typhoid fever are due to the

same form of typhoid bacillus. The serum of a patient suffering from any given form of typhoid fever produces its most characteristic reaction only with cultures of the species of bacillus which has produced the fever. The variations in typhoid bacilli are well known; hence the different degrees of success of the Widal reaction. A corresponding state of affairs exists with regard to the therapeutic action of streptococcus serum. Antistreptococcus serum has a beneficial effect only in cases in which it is prepared from exactly the same variety of streptococcus as produces the pathological condition to be treated. The number of differing streptococci is legion; hence the dissatisfaction with this remedy. Long ago it was shown that if lesions were produced in the ears of rabbits by the injection of different cultures of streptococci, one set of lesions might be rapidly cured by the subcutaneous administration of antistreptococcus serum, while the set of lesions in the other ear, absolutely uninfluenced by the remedy, continued their course as before.

The Widal test has proved its usefulness as a diagnostic aid. It has not proved to be all that was at first claimed for it; more especially at the beginning of typhoid fever when some pathognomonic sign would be of the greatest service. Widal's work, however, and the general introduction of the test throughout the world promises to be of special service in opening up new vistas in our knowledge of typhoid fever. There is good reason to hope that the recognition of various types of typhoid fever will become possible and that the prognosis of the disease, as regards the possibility of its abortion and the probability of a relapse in any given case, will become more assured. No single advance in medicine can be judged by itself, but by its influence upon cognate truths. In its suggestive value for further investigation the Widal test has been very rich. Its employment and the critical adjudication of its results promise a new era in our knowledge of an extremely important department of medicine.

PRACTICAL POINTS ON THE DYNAMICS OF LIFE.

PROFESSOR LOEB of the University of Chicago has been delivering at Columbia University during the past two weeks a series of ten lectures on the Dynamics of Life. As Dr. Loeb's work in biology is attracting much attention, popular as well as scientific, it is almost needless to say that the lectures gave in scientific terms the results of simple but suggestive scientific investigation, and the last thing that could be thought of was any

attempt to make his conclusions have a wider application, or his observations a more far-reaching significance than was justified by the actual facts.

Certain of the recent biological advances have a special interest for medical men because they touch more or less nearly on topics of practical medical import. For instance, it has long been one of the mysteries of pharmacology that the natural mineral waters seem to be able to accomplish results that the best possible imitations of them do not affect. This mystery has attracted no little attention. Professor Liebreich in Berlin suggested that it was possible we did not as yet, notwithstanding all our presumed accuracy and completeness of analysis, know the definite composition of the ingredients of mineral waters. He pointed to the comparatively recent discovery of argon in the air as an example of the possibilities of analytic discovery that exist in even the most familiar substances. Dr. Loeb presents some suggestive thoughts that have a possible bearing on this subject. It was found that the eggs of certain minute marine creatures fail to develop if a single one of the ingredients in their native sea-water has been removed. It matters not which one of the ingredients is lacking the result is the same, while the eggs will nevertheless develop in distilled water. It is as if a certain equilibrium of chemical affinities or, as Professor Loeb prefers to call it, of ionization, existed in normal sea-water, which favored development of the eggs, while any disturbance of this equilibrium acted to inhibit such development. The application of this idea to the problem of the therapeutics of mineral waters is obvious.

Professor Loeb is prone to consider most of the metabolic processes carried on by the fluids of the body as really electrical in character. It is not so much the atoms of salts in solution that exert an influence upon tissues as the electrical charges the atoms bear and which act and react upon oppositely charged particles. These atoms bearing each an electrical charge are the ions of the newer physico-chemical physiology. In the now well-known phrase of Arrhenius, "It is the ions that act," and Professor Loeb's work has consisted mainly of the application of the ideas of Van t' Hoff, Arrhenius and Ostwald, especially of the latter, to physiology.

Under these circumstances it might have been expected that he would foresee a great future for electric therapeutics. On the contrary, his opinion is most pessimistic with regard to the possible benefits to be derived from any form of electrical treatment. In the oscillatory waves of electricity

of high potential introduced into medicine some years ago by D'Arsonval and that raised such high hopes because they seemed to be possessed of so much latent energy, Professor Loeb sees especially little to hope for. They actually produce no physiological effect because we are protected from them by our epidermis as by an impermeable screen. The X-rays alone seem to have some promise in them, although this is as much perhaps because of the accompanying light as of the electric radiations. For Professor Loeb sees a large future in light as a therapeutic agent. There is no form of living protoplasm that at some period of its existence is not very seriously affected by light and luminous radiations have a penetrating power and a dirigibility that make them very promising for future therapeutics.

There are certain points in which Professor Loeb differs completely from his colleague at Chicago, Professor Matthews. The latter asserts that cathelectrotonus may be due to the coagulation of material that takes place at the cathode when a muscle is stimulated. The facts, however, fail to justify any such conclusion. Coagulation is a slow process requiring enormous currents, comparatively speaking, to bring it about, while the phenomena of electrotonus and cathelectrotonus are rapidly developed and require but small currents. It is unfortunate that we are reminded in this connection of some of our friends, the newspapers, who print a rumor to-day and make a news item of its correction to-morrow. We are scarcely to expect such battle-dore with presumably scientific truths at a great university. On the whole Professor Loeb's review of the newer physiology founded on the recent physical chemistry, as the Germans call it, has proved not only interesting but eminently suggestive. More than this, however, can scarcely be said of it. Much of the present widely-gleaned information will have to be carefully winnowed before it will come into the garner as scientific truth. Many of the apparently suggestive practical hints will prove utterly fallacious. There is a justifiable pride, however, in thinking that this original work of the very highest order is being accomplished here in America, and it remains as a simple duty to see that it shall not be sensationally vulgarized before its true import is recognized.

QUACKS IN GERMANY.

ACCORDING to recent Berlin police reports nowhere in the world have quacks and their nos-

trums more support than in Germany. While the city population of Germany has increased 58 per cent. and the regular medical men 76 per cent., the quacks have increased 1,537 per cent. Of 123 men who were found to practise medicine in Berlin without a license 30 had been domestics, 45 artisans, and 16 clerks. Only 24 had even a fair education. The women quacks were more numerous than men quacks. Of 130 found practising without a license only one was even fairly well educated. Sixty had been servant girls; 24 dressmakers, 10 charwomen and five nurses. The three men who made the largest incomes had been clerks; of the three most prosperous women two had been washerwomen and one a milliner. Thirty per cent. of the men and 15 per cent. of the women had been in jail.

Considering the quackish performances of men in high station and the appointment by Bismarck of antifat quacks to medical positions in the universities, this increase in German quackery is not surprising. Considering, also, the attempt by theologians to obtain control of medical institutions, insane hospitals, etc., popular tendency to quackery is naturally increased. Among a certain large proportion of the German agricultural population and the lower middle class, there is a strong tendency to mysticism and this always tends to the occult, of which the quack is a representative. Despite all the sacrifices of personal liberty which Germany has made to secure paternalism, it is obvious that regulation of quackery is as ineffectual there as in the United States.

ECHOES AND NEWS.

NEW YORK.

The Spitting Nuisance in New York.—The anti-spitting crusade has been very active within the past few weeks. Last week over fifty expectorators were arrested and of these thirty-two were each fined \$5.00.

Eastern Medical Society.—The Eastern Medical Society of New York City held its annual dinner at the Broadway Central Hotel Saturday evening, March 22d. The attendance was the largest in the Society's history. After the dinner was served the following toasts were responded to: "Man and Mind," by Rev. Dr. G. Gottheil; "Our Specialties," by Dr. Emil Gruening; "Our Hospitals," by Dr. Arpad G. Gerster; "Our Sister Societies," by Dr. Parker Syms; "Our Own Society," by Dr. R. Abrahams.

Work of the Babies' Hospital.—The annual report of the Babies' Hospital for the past year shows that only \$450.55 was paid for board of patients during that time. A training-school for nurse maids has been established in connection with the hospital. A six-months' course is necessary and after the maids have finished this they are kept under the observation of the hospital authorities; so competent nurses for young children may always be had there. The hospital has

treated in the eleven years since it was founded 32,000 patients. The new hospital now being built at Lexington Avenue and Fifty-fifth Street is to be a seven-story, fireproof building. There will be five wards, accommodating fifty patients, besides the nurses and officers. All the branches of the hospital will be located in this building.

Hospital Funds Distributed.—The Saturday and Sunday Association has this year collected nearly eighty thousand dollars. During the present week its committee has apportioned the major part of this amount among thirty-eight local hospitals on the basis of the free work done by each. The first six on the list are as follows: Montefiore Home, \$6,600; St. Luke's Hospital, \$6,038.05; Mt. Sinai Hospital, \$5,351.55; Roosevelt Hospital, \$4,346.31; German Hospital, \$3,823.94; Ruptured & Crippled, \$3,504.91.

PHILADELPHIA.

Smallpox and Typhoid Fever Abating.—For the week ending March 22d, there were reported thirty-five new cases of smallpox with three deaths and sixty new cases of typhoid fever with eleven deaths. This is the smallest number of deaths from these two diseases for any one week since 1900. There are now 219 cases of smallpox under treatment.

Charity Ball Receipts.—Each of the four beneficiaries will receive \$2,850 as its share of the proceeds of the twenty-second annual Charity Ball held last month. The recipients this year are the children's wards of the University of Pennsylvania and Jefferson Medical College Hospitals, the Rush Hospital for Consumption and Allied Diseases, and St. Timothy's Memorial Hospital and House of Mercy, Roxborough.

Obituary.—Dr. Gerhard Loeling, who had practised in the northern section of the city for nearly thirty years, died suddenly of heart disease, March 23d, aged sixty-nine years. Dr. Loeling was born in Prussia, his father being an eminent surgeon of that country.—The body of Dr. Harry Whitesell, of Sewickley, was found March 23d, resting on a ledge of rock on the Ohio River bank, he having been killed by a fall, while making a night call on a patient.

Vacancy at Polyclinic Filled.—Dr. J. Alison Scott has been elected professor of clinical medicine and therapeutics in the Philadelphia Polyclinic to succeed Dr. S. Solis Cohen who resigned a short time since. Dr. Scott, who graduated from the University of Pennsylvania in 1889, is instructor in clinical medicine at the University and physician to the Pennsylvania Hospital and to the Church Home for Children.

Reception to Dr. Wyeth.—The Medical Club of Philadelphia will give a reception at the Hotel Bellevue on the evening of April 5th in honor of Dr. John A. Wyeth of New York City.

Training-School for Crippled Children.—Work is to be at once begun on the buildings of the Widener Memorial Training-School for Crippled Children at Logan. The plans provide for a three-story main, or administration building, 42 by 84 feet in size, with side wings 72 by 34 feet each. In addition to this will be an educational building, an industrial building, and two cottages, each 88 by 45 feet in size. The children will receive instruction in physical, manual, and mental training. Provision for medical and surgical treatment will be made by the inclusion of wards in the buildings. The donor, Mr. P. A. B. Widener, who erects the institution as a memorial to his wife, has stated it to be a home, hospital, and school for crippled children, where they can be cared for if helpless, receive such medical or surgical aid as shall be necessary and, in addition to a general education, receive

instruction in such industrial pursuits as will assist them to become self-supporting. The entire cost of the institution, including endowments, will be about \$2,000,000. Dr. De Forrest Willard will have general charge.

A New Operation for the Cure of Cystocele.—At the meeting of the Section on Gynecology of the College of Physicians, March 20th, Dr. Barton Cooke Hirst detailed a method of correcting cystocele, which he has been employing during the past few months. Dr. Hirst stated that repair of the anterior vaginal wall was much more difficult than that of the posterior wall or of the cervix. For the two latter there are well-recognized and satisfactory operations, but for the former there is no one method that will cure. There may be two elements entering into a tear of the anterior vaginal wall; (1) The wall is torn loose from the subjacent tissues, and (2) there is a tear of the transverse muscle which extends from the ischium to the pubis and which has an attachment to the anterior vaginal wall. This muscle is frequently torn and any operation which does not recognize this element is not a complete one. If the wall alone be united the muscular support is lacking. If the ends of the muscle alone be united there will still be a bagging of the other tissues. The operator must recognize both. In addition to denuding a central area Dr. Hirst displays the anterior vaginal sulcus of one side by means of three bullet forceps, the triangular area thus mapped out being also denuded. The opposite sulcus is then treated in like manner, although the tear is usually only on the left side. The denuded areas are then closed by sutures, the buried tier suture being preferred. The statement was made that time must elapse, probably ten years, before the real status of this operation could be determined from observation of the cases on whom it is being used. Dr. Hirst also stated that an anterior operation is needed in the great majority of cases in which the posterior is done, it being a false notion that the anterior vaginal wall is supported by the posterior.

CANADA.

A Canadian Honored in the Philippines.—A little over a year ago Dr. Harry J. Watson, a graduate of Trinity Medical College, 1896, who was then practising at Ottumwa, Iowa, was appointed to the United States Army Medical Service in the Philippines. He has just been appointed chief of the Medical Department of the largest Brigade Hospital in the Philippines. Considering the fact that there are over 475 doctors on the active service list in these Islands, Dr. Watson may be considered to have gained a high honor. It is understood also that Dr. Watson's superior officers have recommended him for a "majority" for distinguished service in the presence of the enemy.

Arts Degree for Medicals at Toronto University.—Arrangements have just been made by the Senate of Toronto University whereby candidates can secure a degree in arts in four years and then go on and secure a degree in medicine in an additional two years. The subject of anatomy will be introduced as an option in the third and fourth years in arts. In this way a student will be enabled at the end of his fourth year in arts to proceed directly to his third year in medicine.

Alleged Blackmailer Pleads Guilty.—A short time ago in Toronto a man endeavored to extort money from two physicians who had been called in to attend his wife and child, respectively. The case came up in the Sessions last week and the very slim defence put up by the defendant soon collapsed, when he pleaded guilty to the charge. Sentence will be pronounced next week.

Obituaries.—Dr. Theodule Bolduc, Montreal, an ex-house-surgeon of the Notre Dame Hospital, that city, died suddenly from heart disease on the afternoon of March 20th. The deceased was only twenty-six years of age, and had only recently commenced the practice of his profession.—Dr. A. Dixon Wagner, a prominent practitioner of Eastern Ontario, died at Cornwall on February 13th, at the age of fifty-three years. He was a graduate of McGill University.—The death of an old Toronto boy and a graduate of Trinity Medical College occurred at Seattle, Wash., on March 21st, of typhoid fever. Dr. F. H. Thompson was a son of a prominent citizen of Toronto and was one of the officers of the Coast and Geodetic Survey steamer "Patterson." He had spent the last two years in Alaska near Cape Nome and Sitka.

The Canadian Medical Association.—The next annual meeting of this Association will be held at Montreal on September 16, 17 and 18, 1902, under the presidency of Dr. F. J. Shepherd of that city. Dr. George Elliott, Toronto, is the general secretary. The Address in Medicine will be delivered by Professor Osler of Johns Hopkins and the Address in Surgery by Dr. John Stewart of Halifax, Nova Scotia. It is expected that there will be a very large attendance at the Montreal meeting.

The Ontario Medical Association.—This Association will hold its annual meeting in Toronto on June 4th and 5th under the presidency of Dr. N. A. Powell of that city, Dr. Harold C. Parsons of Toronto being the general secretary. Dr. John T. Fotheringham has been appointed chairman of the Committee on Papers and Business. It is understood that there will be several new and interesting features of the 1902 meeting.

The Southern Medical Association of Manitoba.—This Association, which has only lately been formed, met at Brandon on February 26th, over sixty of the leading physicians of the Province being present. President McConnell of Morden occupied the chair, while Dr. J. T. Lamont of Treherne, who has been greatly instrumental in organizing the Association, acted as secretary. The following papers were contributed: "Necessity of Organization in the Medical Profession," by Dr. J. T. Lamont; "The Ethics of the Profession," by Dr. H. P. Elliot, Morden; "Differential Diagnosis of Smallpox," by Dr. James Patterson, Dominion Health Inspector; "Quarantine in Smallpox," by Dr. Macdonald, Brandon; "Christian Science," by Dr. J. R. Jones, Winnipeg; "Gall Stones," by Dr. H. H. Chown, Winnipeg, past-President of the Canadian Medical Association; "Delayed Union and Non-Union of Fractures," by Dr. John Hardie, Morden. In the evening the profession of Brandon tendered the visiting members a banquet. The following officers were elected for the ensuing year: President, Dr. L. M. More, Brandon; Secretary, Dr. Little, Alexander; Executive Council, Dr. Poole, Neepawa, Dr. Goodwin Elkhorn, Dr. Thompson, Douglas; Drs. Macdonald and McDiarmid, Brandon.

GENERAL.

Mosquitoes and Malaria.—The military authorities in Formosa, says the Tokio correspondent of "The (London) Times" are experimenting extensively in order to determine the influence of mosquitoes on malaria. A battalion of soldiers was completely protected from mosquitoes for 161 days during the malarial season. It entirely escaped the disease. An unprotected battalion at the same place had 259 cases of malaria.

American Association of Pathologists and Bacteriologists.—This new society holds its second annual meeting this week at Cleveland. The program is

a very interesting one and a full report will appear in the **MEDICAL NEWS**:

Tri-State Medical Society of Iowa, Illinois and Missouri.—The tenth annual meeting of this society will be held at Chicago on April 3d and 4th, under the presidency of Dr. John C. Murphy of St. Louis. Dr. William B. La Force, Ottumwa, Iowa, is the secretary, and Dr. Emil Ries, Chicago, chairman of the Committee on Arrangements. An interesting program is announced. An abstract of the proceedings will appear in the **MEDICAL NEWS**.

Death of the Sultan's Physician.—News is received of the death of the Sultan's chief physician, Mavrogeni Pacha, at Constantinople. Born in 1817 of a noble Greek family, he received his medical education in Vienna, and upon his return to his native country soon became one of its most prominent physicians. He was a professor in the Imperial School of Medicine and the author of several scientific works. One of his sons was at one time minister from Turkey at Washington.

An Oculist-Prince.—Duke Carlo Theodore of Bavaria, who is a physician by profession and a specialist in diseases of the eye, a short time since performed his four thousandth operation for cataract.

Cholera in Manila.—The outbreak of cholera does not create alarm. No white person has been stricken with the disease. According to the report, there have been forty-nine cases and thirty-nine deaths. Experts have gone to investigate the five cases at Malolos, just north of Manila, and the two cases at Aparri in Northern Luzon.

Bubonic Plague in California.—At Berkeley just outside of San Francisco a case of plague has been reported.

Summer Session of Medical Department.—The summer session for 1902 of the Medical Department of the University of Michigan will extend from Monday, June 23d, to Friday, August 8th. The courses offered are classified as *special*, designed for graduates and advanced students, for which no credit will be given, and *credit* courses, which duplicate certain portions of the regular curriculum, and on the satisfactory completion of which, credit will be given. No allowance for time will, however, be given for work done in the summer school; a student cannot, therefore, shorten his residence in college by attending one or more summer sessions. In the laboratory and demonstration courses offered, opportunity will be given the student to do the work for himself, under the personal direction of the instructor. He may thus familiarize himself with the apparatus and instruments used in laboratories and in diagnostic work, and become conversant with their uses. The abundant clinical material of the University hospitals will be at the disposal of the instructors offering special clinical courses and will be freely used for diagnostic work, beside instruction and general clinics.

St. Louis Medical Society of Missouri.—At the meeting held March 22, 1902, Dr. Hugo Ehrenfest read a paper on "Conservatism in the Treatment of Inflammatory Affections of the Uterine Adnexa." The program for next week is as follows: "The Operative Treatment of Prostatic Obstruction," by Dr. Bransford Lewis; "The Application of the Cautey by a New Method for the Reduction of Prostatic Obstruction," by Dr. Wm. N. Wishard, of Indianapolis; "Some Phases of Prostatic Surgery," by Dr. J. P. Bryson, and "Perineal Prostatectomy from the Standpoint of the General Surgeon," by Dr. G. W. Broome.

Vanderbilt Hospital Ward.—Everything is now ready to begin work on the Vanderbilt ward of the Newport Hospital, which Mrs. Cornelius Vanderbilt is

to erect as a memorial to her deceased husband. This building, which is to be constructed of limestone similar to that used in "The Breakers," is to be 125 feet long, 40 feet wide at either end and 50 feet wide in the center. It is to be three stories high. The first floor will be for the treatment of out-patients, the second and third floors will be arranged in rooms, with a children's ward on the third floor.

Pure-Food Bill Favored.—The House Committee on Interstate and Foreign Commerce March 24th voted to report the Hepburn Pure-Food Bill, so called, to prevent the adulteration, misbranding, and imitation of foods, beverages, candies, drugs, condiments, etc., and regulating interstate traffic in such goods. The bill was framed by the National Pure-Food Congress, and for some time hearings have been in progress on this and other pure-food measures. To-day the vote was taken, and was practically unanimous for reporting the Hepburn bill.

Obituary.—Dr. John E. Richardson, a prominent Brooklyn physician, died this week at his home, 127 South Oxford Street, of cancer of the neck. He had been undergoing treatment for several months under the direction of Dr. H. B. Delatour, who had used the X-ray. Dr. Richardson was born fifty-one years ago at Albany, and was the son of "Deacon" William Richardson, former President of the Atlantic Avenue Railroad Company. Dr. Richardson received his early education at the Brooklyn Polytechnic Institute and began work as receiving teller in the Broadway Bank. Later he took up the study of medicine, graduated from the College of Physicians and Surgeons in 1877 and spent several years at Vienna and Berlin. He later became an interne of the Brooklyn Hospital. For a number of years he was the chief surgeon of the Long Island Railroad, of the Atlantic Avenue Railroad and of the Brooklyn police. He was a member of the Oxford, Riding and Driving and Crescent Athletic Clubs of Brooklyn. He was a trustee of the Emmanuel Baptist Church.—Dr. George W. Cushing died on Thursday, March 20th, after a brief illness at his home, No. 221 Schermerhorn Street, Brooklyn. He was born in Canada fifty-three years ago, and came to Brooklyn when a boy. He was graduated from the Long Island College Hospital in 1874, and had practised medicine at the Schermerhorn Street address ever since. He was a member of the Kings County Medical Society, the New York State Medical Society and Long Island Council, Royal Arcanum. His wife, whom he married in 1879, died about three years ago. He leaves a son and daughter.

1871 he joined the Faculty of the Columbian University, in which for nearly twenty years he has occupied the chair of medicine. By devotion to both the scientific and practical aspects of his work he became recognized as one of the foremost clinicians of the South, and to a large and important general medical practice he added the cares and responsibilities of a consultant. He inherited the most select practice in the District, and most of the prominent politicians of the community have come under his care. He was an active member of the Association of American Physicians and the Treasurer of the society until two years ago. To its Transactions he contributed some of his most important papers, particularly those on "Typhoid Fever and Malaria" and on the "Geographical Distribution of Typhoid Fever in the United States." Dr. Johnston was one of the best students of dysentery in the country, on which subject he contributed many important articles, the last a complete and fully up-to-date paper in the new edition of Wood's Reference Handbook of the Medical Sciences.

As a teacher he was thorough, painstaking, clear and concise, and was always interested in the welfare of his students.

As a practitioner Dr. Johnston had the faculty of imparting confidence to an unusual degree. He had a calm manner, a quiet but firm voice and a gentleness and tenderness which soon made him beloved by his patients. A careful diagnostician, sparing no pains to ferret out the details of an obscure case, he was, in addition, a skilful therapist, not believing in many drugs (as was natural in a student of Hughes Bennett), but displaying a full mastery over the important ones. The demands of teaching and of a most exacting practice were met with unflagging energy, and throughout the past winter he was able to accomplish an extraordinary amount of work. About two weeks before his death he had an attack of severe substernal pain, with great prostration. He recovered sufficiently to go to Atlantic City, where he had a second severe attack, in the convalescence from which he died suddenly.

Dr. Johnston will be missed by a large circle of friends in the profession, particularly at the Washington meetings of the special societies and of the Congress, in the arrangements for which he always took an active interest.

We are glad to learn that he leaves a son in the profession, Dr. W. B. Johnston (at present one of the assistants of Professor Osler), in whom we hope the profession may find a worthy successor to his father and grandfather.

OBITUARY.

W. W. JOHNSTON, M.D.

By the untimely death of Dr. Johnston the District of Columbia has lost its most prominent physician and the profession at large a valued and much honored member.

Dr. Johnston, son of the well-known Dr. George Johnston, of Washington, was born December 28, 1843. He received his education in private schools and in the college of St. John's, Maryland. He graduated from the medical department of the University of Pennsylvania in the year 1865, and spent a year studying at the University of Edinburgh and in Paris. One of his recent papers is a well-merited tribute to his old master, John Hughes Bennett. He also spent some time in the hospitals of New York. Returning to Washington he began practice with his father and soon was recognized as an industrious and energetic student. In

CORRESPONDENCE.

OUR LONDON LETTER.

(From Our Special Correspondent.)

LONDON, March 8, 1902.

THE SMALLPOX EPIDEMIC; WILL IT SPOIL THE CORONATION PAGEANT? THE JENNER FAMILY.

THE visitation of smallpox which began last summer is slowly but steadily gaining ground in London. The epidemiologists tell us that a considerable outbreak is now due. The disease, where not prevented, as in Germany, by efficient vaccination, shows a prevalence curve which attains its height every thirty-three years or thereabouts. Our last visitation was in 1871. This one has again found us ill-prepared; the Antivaccination League has pursued its mischievous propaganda all over the country and the medical profession, secure in its own belief, has not taken the trouble to carry on a counter-campaign. The Royal Commission on Vac-

cination which reported some half a dozen years ago recommended that compulsory vaccination should be abolished; in doing so it only formally recognized the fact that, although vaccination was *de jure* compulsory, it was not in many parts of the country *de facto* "compelled." John Bull, as was said by some one who knew him well, dearly prizes the privilege of going to the devil in his own way, and accordingly he resented the idea of compulsion. When defaulters were dealt with by the legal authorities, they were treated by their brother fanatics as martyrs to the blessed truth that vaccination is an unclean thing; their fines were paid for them, and when they came out of prison they were met by a rabble of sympathizers with bands and banners. The new Act stopped all this, but it created a strange being called the "conscientious objector" who is suffered to allow his offspring to go unvaccinated if he gets a certificate of exemption from a magistrate. This ceremony involves a trifling amount of trouble as the applicant has to appear in person and has besides to pay a shilling for the document. These conditions, though they can scarcely be called onerous, have proved sufficient to damp a good deal of cheap enthusiasm, and there has been a marked increase in the amount of vaccination in the last two years. London, however, is still very imperfectly protected, and in the parish of St. Pancras where the present epidemic broke out it is estimated that about a third of the rising generation had escaped what Dr. Job Collins, a member of the London County Council and one of our antivaccination heresiarchs, calls the "Jennerian rite." The health authorities have displayed great energy in persuading people to submit to the "rite," and for many weeks every other person one met in the street wore a red band on his left arm as a warning to the casual passerby not to rub against him. There has, however, been a good deal of carelessness in other matters. A week or two ago the attention of the President of the Local Government Board was called in Parliament to the fact that a patient in one of the hospital ships for smallpox cases had been visited by his mother and sister, the former of whom was shortly afterward herself admitted as a patient. The President stated in reply that every precaution was taken by the officials of the Metropolitan Asylums Board under whose control the hospital ships are to minimize the risk of infection being spread by persons visiting patients. He said the visitors on their arrival are invited to partake of a light meal in order that they may be physically better able to resist infection. They are then seen by a medical officer, who inquires into their condition as to vaccination, and, if necessary, urges on them the advisability of immediate revaccination. Before entering the wards the visitors are dressed in overalls and caps, and while in the wards they are on no account allowed to touch or in any way handle their relatives or the beds on which patients are lying. After a brief stay in the wards—some minutes only—the visitors are taken to a dressing-room where the overalls and caps are removed, and they themselves undergo a thorough washing of the hands and face before leaving the hospital premises. The fact of every visit is communicated by letter to the medical officer of health in whose district the visitor resides, whether that visitor has been recently revaccinated or otherwise. In the case referred to in the question the two visitors refused to be revaccinated at the time of their visit to the ships. Notwithstanding this official statement it is whispered that the authorities of the smallpox hospitals have been extraordinarily lax in admitting visitors. I am informed that at least seventy persons who have been allowed to visit friends in the hospitals have returned as patients during the last two or three

months. This laxity is all the more remarkable as the general hospitals have been very strict in forbidding the admission of visitors.

The epidemiologists say that the epidemic will not reach its highest point till May and June. This raises an interesting question as to the Coronation of King Edward the Seventh which is fixed for the end of June. The pageant is certain to attract enormous crowds of people who will be packed in dense masses in the streets and windows, perhaps even on the chimney tops to which, according to Mark Antony, the Roman people climbed "to see great Caesar pass." We hear that a trifle of 20,000 Americans are expected to grace the festival. But there is an ominous rumor abroad that it is quite possible that there will be no processions at all in connection with the Coronation. The King is said to be unwilling to be the cause of possible danger to his lieges by gathering together a vast concourse of people when the germs of smallpox are borne about in countless numbers "horsed on the sightless couriers of the air." The Coronation will not, however, be put off, and it is difficult to see how the King is to get to Westminster Abbey where the ceremony of making him "the Lord's Anointed" is to be carried out—unless he goes there in a cab in disguise.

In connection with vaccination it may be mentioned that Mr. Victor Plarr, Librarian of the Royal College of Surgeons of England, has recently unearthed some information as to the fate of the descendants of Edward Jenner, the discoverer of vaccination. He himself died wealthy, and his son Colonel Jenner inherited his wealth. But his nephews were less fortunate, for in 1840 a petition was presented to the House of Commons on behalf of Henry Jenner, Doctor of Medicine, and the Reverend George Charles Jenner, Clerk in Holy Orders, setting forth that the petitioners were the nephews of Dr. Edward Jenner; that they were of the respective ages of seventy-three and seventy-one years; that they both very materially assisted Doctor Edward Jenner in the investigation and practice of vaccination; and they expended nearly the whole of their property in promoting the object of Doctor Jenner's discovery; that Doctor Jenner would have been a much richer man if he had kept vaccination secret, and not divulged the practice of it for the benefit of mankind; that Doctor Jenner, by his will left Dr. Henry Jenner only an annuity of twenty-six guineas, and the Reverend George Charles Jenner a legacy of twenty pounds; "that under these circumstances your Petitioners humbly submit to the consideration of your honorable House their case, trusting that their services and for the sake of the memory of a man who conferred the greatest benefit upon the human race, that under Divine Providence was ever conferred upon it will not be passed over." Of the two nephews Jenner seems to have preferred George, the clergyman, who had in the first instance been educated for the medical profession. He and his brother Henry went as apostles of vaccination to Ireland. Things did not go well with Henry, for in 1839 he wrote, "I have sacrificed my health in and a vast deal of my time with anxiety, attention and exertion in the cause of vaccination, with much of my pecuniary resources and lessening my professional practice, indeed to such a degree as to induce my receding to a more humble station in society." Nothing seems to have come of the appeal to the generosity of Parliament. Henry died in 1851, at the age of eighty-four, at Berkley, where his famous uncle had practised; the date of his brother's death is unknown. In 1843 a son of his, Doctor William Henry Jenner, applied for the post of Inspector of Vaccinators at the National Vaccine Institution, but it was given to another, William

Henry died in 1850 and in 1860 his widow was for the third time a candidate for a pension from the Royal Medical Benevolent Fund. One hopes that she was successful; it is hardly conceivable how such claims as hers can have been passed over.

OUR BERLIN LETTER.

BERLIN, March 15, 1902.

ETIOLOGY OF CANCER—SCHÜLLER AND HIS NEW PARASITE OF SYPHILIS—HEALTH OF DR. VIRCHOW—DEATH OF PROF. WOLFF—BISMARCK'S PHYSICIAN IN WARFARE.

THE question of the etiology of cancer is at present a very burning one, as the newest statistics prove a decided increase of the malady for all civilized countries. In England, for instance, of one million inhabitants in the decades 1861-70, 3,840, in 1871-80, 4,680, and in 1881-90, 5,890 people died from this disease. In the Netherlands in 1874, there were 490 deaths, and in 1897, 910 deaths from cancer for each million of inhabitants. For Switzerland the ratio is 1,324, and in New York the number of cancer deaths in 1888 was 2,473, in 1897 4,117.

Your readers probably remember that it was claimed by Prof. Czerny of Heidelberg that the parasites of Schüller were in reality cork cells, to which statements the latter replied in the "Deutsche medicinische Wochenschrift" (No. 36, 1901), that the conclusion of Czerny was entirely erroneous, as he, Schüller, had his culture tubes closed exclusively with rubber or glass stoppers and that all fluids used by him had been previously filtered. True, the capsules which contained the parasites had some resemblance to cork cells, but this he had mentioned already in his book. However, he has told your correspondent that since this utterance from Heidelberg he had taken special precautions to avoid the use of cork and could nevertheless find the same organisms in all his examinations, sometimes capsules filled with young parasites, sometimes empty capsules, and again non-encapsulated parasites. Rost, a pupil of Koch, has propagated the same parasite for the first time. Schüller himself observed contractile movements of the live organisms, as well as their typical reaction against heat and alcohol, and he said he could follow all phases of development of the young organisms in trial animals injected with his cultures. Schüller desired very much the help of the Government to facilitate his researches, inasmuch as he, though an eminent surgeon, is not rich; but he is not favored by the powers that be and he must "paddle his own canoe" and also defend himself against the skepticisms of his confrères. He has also discovered a parasite of syphilis, of which your correspondent has seen some specimens. He will soon publish his new discovery, which he claims can be demonstrated not alone in primary infections, but in luetic cases of long standing and in hereditary syphilis.

The health of Prof. R. Virchow is physically all that could be expected after such a painful accident in a man of his age; mentally, he is not the same, it is said. His memory is defective and it is very doubtful if he will ever be able to resume his old position at the University.

In the death of Prof. I. Wolff, popularly called "the Bone Wolff," the Berlin University has lost a very good man. It was his individual work to prove that the arrangement in the formation of the bones represents the static laws. He also was the first to close the defects of harelip and cleft palate. He died of cerebral thrombus, after an illness of only two days.

A stage of open war, which is rather unique, exists between the physicians attached formerly to the County Hospital at Gross Lichterfelde, a suburb of Berlin, and

the managing physician, Prof. Schweninger, formerly the court physician of Prince Otto von Bismarck. He seems to have some peculiar notions in regard to medical affairs, which are not relished by the other physicians. For instance, he does not believe in the value of statistics, does not permit the use of diphtheria serum in diphtheria cases, looks extremely doubtful at the operation of tracheotomy and does not favor the practice of surgery in general. The institute is presently without a surgeon, the former incumbent was Prof. Schleich, of anesthesia fame. Thus far the Government has upheld Prof. Schweninger, but the county representatives refuse to contribute any money until the affair is settled.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

Stated Meeting, Held March 6, 1902.

The President, Robert F. Weir, M.D., in the Chair.

THE scientific business of the evening consisted of a meeting of the Surgical Section before the Academy. The use of the X-rays in the treatment of malignant disease was the subject discussed. The paper of the evening was read by Dr. Francis H. Williams of Boston.

X-Rays in Medicine.—Dr. Williams said that in discussing the question of the therapeutic effect of the X-rays one must not lose sight of the place that Roentgen's discovery has already made for itself in the domain of medicine. In certain branches of diagnosis, the X-rays now represent one of the most conclusive and most useful methods of obtaining accurate information. Without them the diagnosis of fractures would lose not a little of its present-day certainty. In thoracic disease data have been given for the accurate recognition of degenerative lesions. In tuberculosis, in aneurism, in the matter of intrathoracic growths and, generally, in the usually obscure diagnostic field of thoracic work, the X-rays have proved a veritable touchstone for the eliciting of truth.

Technic of X-Rays.—With regard to the therapeutic effects of X-rays the question of the method of producing the rays is of the first importance. It used to be said that the X-rays as obtained from a static machine were not effective therapeutically, and that it was necessary for remedial action to produce them by means of a Ruhmkorff coil. Further observation has shown, however, that X-rays obtained through either source are of about equal therapeutic value in their effect if other conditions are properly arranged. Dr. Williams uses a static machine for the production of the X-rays in hospital work, and a coil at his office. The static machine consists of eight plates six feet in diameter. Much more important than the source of the electrical energy is the matter of choice of the tube to be employed. In low-resistance tubes many of the rays are absorbed but they are not in the high resistance tubes. These latter should be used for tumors situated deeply in the tissues and the former for superficial growths.

Application to Patient.—A perforated diaphragm of lead should be so used that the rays produce their effect upon the tissues only a little beyond the diseased area. Pure tin is more agreeable and easier to handle than lead and is often employed for this purpose. As the seance must continue at times for as long as twenty minutes, the first care should be that the patient shall be in a comfortable position. Dr. Williams has found it important to enclose the tube within a box in order to protect the operator and others who may be in close proximity, as well as other parts of the patient himself, from the effect of the rays. If the inside of the box be

well coated with white lead it will very well serve its purpose of preventing the action of the rays.

Length of Exposure.—At first the exposure of the part to the rays should not extend beyond five, or at most ten minutes, so as to enable the operator to recognize how much effect is being produced and to forestall any possible idiosyncrasy as regards oversensitiveness of the patient to the rays. The exposure should be made two or three times a week. In tumors that are of slow growth very little result will be noticed from such short exposures, and they will have to be submitted to the rays for twenty minutes or even longer; in rapidly-growing tumors an exposure of five minutes may prove too long. The operator must be careful that the X-rays do not act as a stimulant as the knife does in some cases of rapidly-growing tumors, causing an efflorescence of malignant energy. The first sensation from the application of the rays is usually a sense of itching, prickling or a drawing feeling in the skin. This may usually be considered a favorable sign. In epithelial growths it must be remembered that the effect of the rays is to cause a breaking-down of the malignant tissue overgrowth, though healthy tissues in the neighborhood should not be affected.

Treatment of Rodent Ulcer.—Rodent ulcers are much slower to react to the action of the X-rays than is almost any other form of malignant growth, though the ultimate results are not unfavorable. As a rule, this form of growth is also more obstinate to treatment. As healing of the edges of the ulcer occurs, the opening in the tin or lead diaphragm should be made smaller so as to prevent the action of the rays upon the recently-healed tissues. In this way the ulcer can gradually be brought to complete healing. When glands are affected, these should also be exposed to the action of the rays, and, in general, the X-rays should be directed over the parts to which the lymphatic canals of the tissues lead.

Possibilities of Injury.—It has sometimes been the custom to allow a non-medical man to apply the X-rays. As a rule, such men are only mechanics who understand the production of the X-rays, but nothing about their therapeutic effects. Only imperfect success may be looked for under such circumstances and there are many possibilities of harm being done. Rawlins showed that guinea-pigs may be killed by frequent exposure to the X-rays, even though no external lesion becomes visible. Control guinea-pigs, kept for some time under the same circumstances as the others, but without exposure to the X-rays, were living and well when their companions died. Notwithstanding this, there is little danger of serious results in careful application. The experience of the Boston City Hospital, where thousands of exposures have been made without a single burn, suffices to prove this.

Results of Treatment.—In most of the cases of malignant growth treated by Dr. Williams, microscopic examinations confirmed the clinical diagnosis. So far no malignant superficial growth has failed to yield to the X-rays. This same favorable result has been obtained also in a chronic inflammatory lesion, wrongly suspected of being an epithelioma, and even in a localized nodule of tuberculosis. Rapidly-growing malignant neoplasms are very quickly affected. Slowly-growing neoplasms take longer to be affected. The site of the growth is the most important consideration for prognosis. Epitheliomata upon the face, upon the hand, upon the breast, and upon the tongue have been cured. Thus far every malignant growth, even though not ultimately cured, has been benefited by the treatment. The earlier the cases come for treatment the better is the prognosis.

Inoperable Advanced Cases.—In these cases the

patients can always be promised great relief from the painful symptoms. Dr. Williams has had a case of rodent ulcer that had been operated upon five times, until finally operation became impracticable. Exposures to the Roentgen rays then became a renewed source of hope and consolation, besides greatly adding to the material comfort of the patient. There can be no hesitation in using the Roentgen rays when these are the only hope. For milder cases, however, the conscientious medical man will sometimes hesitate as to whether the knife should not be used. Dr. Williams' own conclusion in the matter is that it takes but a very short time to demonstrate whether or not the Roentgen rays are liable to be of benefit. In two weeks at the most, especially in cases of epithelioma, it will be very plain if there is to be failure of therapeutic effect. Then the surgeon can be called without the delay having added anything to the seriousness of the case. There is no doubt that at times after operation, as a result of the irritation of the tissues and the stimulus of the reparative process that ensues, a malignant neoplasm is stirred into great activity. Hence the advisability of applying the Roentgen rays first in order to test their therapeutic effect, and the knife only later. This seems to be the part of true conservatism.

Illustrative Cases.—Dr. Williams exhibited stereoscopic pictures of various patients who had been benefited by treatment. In one case, that of an old woman, an epithelioma began to improve after the second treatment. In some cases epitheliomata cured by exposure to the Roentgen rays have remained healed for over a year with no signs of recurrence. In only one case in Dr. Williams' experience has there been a recurrence; in this the patient suffering from an epitheliomatous ulcer received a series of treatments, and then, owing to circumstances, and the occurrence of so much improvement that there was no longer any discomfort associated with the growth, nor any tendency to advance, he ceased taking the treatment. The ulcerative lesion continued its favorable progress and healed completely without further treatment. Some six months afterward, however, the cutaneous tissues again broke down and treatment was carefully kept up until the spot was entirely healed. Since then there has been no sign of recurrence. Some cases of carcinoma of the tongue have improved greatly as the result of exposure to the Roentgen rays, but there has been inevitable recurrence in all these cases. The tissues of the tongue are so succulent that the carcinomata seem to acquire a very firm hold. One reason for the failure was that the cases were, as a rule, far advanced when brought for treatment. For favorable prognosis of treatment with the Roentgen rays, an early stage is important. Now, however, that patients know that they may be treated without recourse to the knife, it is probable that many cases will come much earlier than before when fear of the knife was all that kept them from consulting a physician. The earlier cases of cancer of the breast come for treatment by the X-rays, the more hopeful is the prospect. The nodular form of carcinoma is more easy to affect favorably than scirrhous cancer. It is wonderful to note how the hard breast, firmly fixed to the chest-wall, softens and becomes movable as the result of a few exposures to the Roentgen rays. Carcinomatous nodules in the glands shrivel up and disappear under their influence. The nodules of recurrent carcinoma occurring in the cicatrices of operation for the removal of carcinomatous breasts are especially amenable to treatment by the X-rays. Many of these discouraging cases will undoubtedly be cured by early applications of the X-rays, and this addition to one's armamentarium will help out surgical procedures. Dr. Williams exhibited the picture of a boy, six years

of age, who suffered from spindle-celled sarcoma of the elbow. Amputation was done in the upper third, but it was not long before symptoms of recurrence occurred. Sarcomatous nodules appeared in the scar, but under the influence of the X-rays the cicatrix has lost its redness and prominence, and, instead of the hard ridge that formerly marked the scar, there is no induration to be felt except in the central nodule of the scar.

Unfavorable Cases.—Dr. Williams described certain cases in which the X-rays gave relief from symptoms, but failed to produce a cure. One of these was a cancer of the neck which had been removed by operation and had recurred. As the result of the breaking-down of malignant tissue there was a large ulcer in the cervical region. After exposure to the X-rays there were distinct external improvement, less swelling in the cervical region, and much less ulceration. The internal discomfort, however, continued and even became more marked. It is evident that the internal portion of the cancer continued to spread and invade important tissues within the neck. In another case, rather similar, the cancer grew just below the ear; this too, after recurrence, was considerably improved by the X-rays, but difficulty of swallowing set in and continued to increase in spite of the X-ray treatment. It is only a question of time until these patients reach the fatal termination of their malignant disease. In these inoperable and hopeless cases, the feature of the X-ray treatment is relief of pain. Sometimes pain is so severe that even large amounts of morphine fail to relieve it. The first effect of the X-rays is a sense of comfort, which lasts, as a rule, for twenty-four hours, and enables the patient to sleep and even to eat much more heartily than would otherwise be the case. In recurrent carcinomata, even when there is not the slightest hope of ultimate cure by the X-rays, because of internal metastases, their therapeutic effect in producing relief from pain must be tried. Suggestion, of course, has something to do with the relief of pain in these cases, because the formidable apparatus employed has its due effect upon the minds of patients. There is no doubt, however, that relief of pain may be secured in individuals who are ordinarily unaffected by suggestion. Relief occurs even in patients who know nothing of the fact that the most promising part of the X-ray treatment is its amelioration of pain.

Hodgkins' Disease.—Dr. Williams exhibited a picture of a patient suffering from Hodgkins' disease, in whom there was a very marked difference in the size of the cervical regions on the two sides. Before the employment of the X-rays the cervical glands had been about equally affected, and now there is a very striking difference. All of the glands on one side of the body were exposed to the rays and all decreased; those on the other side were not exposed and remained absolutely unchanged. There was also a decrease in the size of the spleen as the result of the employment of X-rays.

Conclusions.—Dr. Williams said, in conclusion, that X-rays undoubtedly do good in cancer. Besides, they arouse no dread, hence patients will come for much earlier treatment than otherwise. There is no shock from their use, their employment is absolutely painless and the cosmetic results are better than from any other method of treatment. With regard to recurrence, one cannot as yet be sure. The X-rays, however, in this regard, certainly promise very well, and if there should be signs of recurrence one can promptly resume the treatment. With regard to internal cancers, the medical man is not justified in promising relief by the use of the X-rays; their employment may lessen discomfort, however, and all external cancers yield absolutely to them. Inoperable cancers will become much more rare,

because in very early stages malignant growths will be submitted to the X-rays.

Quality of X-Rays.—In discussing Dr. Williams' paper, Dr. William J. Morton said that there are two forms of X-ray tubes, those of low and those of high vacuum. High-vacuum tubes give a lack of definition in radiographs that indicates their diffusion through the tissues and a certain absorption of the energy. This is undoubtedly the best form of tube to use for therapeutic purposes. The low-vacuum tubes that give the best radiographs are not so effective. Dr. Morton said that his experience justifies him in believing that the X-rays are sure to be of service in many forms of cancer. Dr. Morton's clinical experiences will be found in the report of the Harvard Medical Society proceedings, soon to be published in the *MEDICAL NEWS*.

Relief in Inoperable Cases.—Dr. A. B. Johnson said that he has had some encouraging results with the X-rays, especially in the recurrence of cancer after operation upon the female breast. This favorable experience also extends to a case of recurrence of carcinoma of the jaw with ulceration into the mouth. He believes that the tubes of large potential electrical energies should be employed and that they should be artificially cooled by means of a water reservoir. He detailed these cases and showed the extremely favorable results, though as yet no absolute cure has been obtained. In one case in which there was a very deep ulcer, the edges of which bled very easily, after two exposures the tendency to bleeding ceased entirely; after four exposures, healthy granulation tissue began to fill up the ulcerated space and it healed like a healthy granulating ulcer. As a rule, in his experience, relief from pain is a very marked feature. The night after an exposure to the X-rays, patients, who had previously been very uncomfortable, rest very quietly. Undoubtedly, with larger apparatus, the X-ray operator will be able to treat carcinomata in deeper tissues than at present.

Unsatisfactory for Rapidly-Growing Tumors.—Dr. William B. Coley reported a series of six cases of sarcoma on which the X-rays had been used at the General Memorial Hospital. One case was that of a rapidly-growing tumor of the right parotid region; it proved to be of extremely malignant character and recurred very shortly after operation. Dr. Coley then tied the external carotid artery and employed the mixed toxins for its treatment. Neither the ligation of the artery nor injection of the toxins had the slightest effect in preventing the growth of the tumor. Eight treatments with the X-rays also produced no effect. The second case was a rapidly-growing sarcoma of the upper jaw. This involved so much tissue when seen that surgical procedures seemed out of the question and the toxins were used without effect. The tumor was then exposed to the X-rays on eleven successive days, but without any improvement. In another case of carcinoma eight treatments with the X-rays had but very slight effect in limiting the growth of the tumor at first, and then ceased entirely to produce any effect.

Slower Sarcomata.—In one case of not very rapidly-growing sarcoma of the femur the tumor has been reduced somewhat in size and the patient is more comfortable. In case of inoperable tumor of the neck which was treated by the mixed toxins, but subsequently recurred, great improvement resulted from the use of X-rays. Not only was the patient made more comfortable, but the tumor was reduced in size and there is even the promise of an ultimate good result. In another patient, operated upon sixteen years ago at the New York Hospital, the tumor was found on pathological examination to be of the round-cell variety. Three

operations were done during the next three years. The first tumor did not seem to have any capsule; later tumors were capsulated. A tumor the size of the first finally developed, was treated with the X-rays and has practically entirely healed.

Epithelioma after Lupus.—Dr. Charles W. Allen presented a patient who, after having suffered from lupus for twenty-four years, developed an epitheliomatous nodule in the midst of a lupus scar. This was treated by means of the X-rays and has improved so much that an ultimate cure seems assured. Dr. Allen, contrary to the experience of Dr. Williams, has found that a rodent ulcer yields without much difficulty to the X-rays. In a recent case, in which a cancerous mass pushed itself out from the surface of the cheek in front of the globe of the eye, after one exposure the mass began to slough away, while its base softened and shriveled up. The pain after the application of the X-ray was cured without suggestion.

Long-standing Carcinoma and Erythematous Lupus.—Dr. Percy Turnure presented a patient who suffered from an injury of the cheek thirty-five years ago which had never completely healed. Six or seven years ago malignant degeneration of the ulcer set in, and about five years ago it began to involve the eyeball; the glands of the neck became involved and the cancer seemed inoperable. The use of the X-rays has produced a profuse discharge and has added greatly to the comfort of the patient. The case, however, seems almost too far gone to present a favorable prospect of cure. Glands that are affected by malignant processes seem to disappear rather easily under the use of the X-rays. Dr. Turnure has come to the conclusion that most of these glands are enlarged not really because of cancerous degeneration, but because of the suppurative process that goes on in breaking down malignant growths. Dr. Turnure has recently had a case of erythematous lupus of very long standing which has been greatly benefited by the X-rays. The patient was exhibited and showed a distinct difference between the parts that have undergone exposure to the X-rays and those which have been left unexposed.

Recurrent Carcinomatous Nodules.—Dr. Hopkins of Brooklyn said that it is in recurrences of cancer after operation that the X-rays are especially valuable. He has recently had under observation a case in which seven nodules, some of them ulcerating, occurred in the scar after operation for removal of the breast. Five of these have already disappeared as the result of exposure to the X-rays and others are disappearing. This improvement in the pathological condition has taken place notwithstanding the fact that the patient is pregnant, and the pregnancy has not been interrupted. It is surely a wonderful power for good that can prevent the stimulus of pregnancy from influencing unfavorably a malignant tumor in the breast. In another case under Dr. Hopkins' care a sausage-like scar, evidently due to cancerous recurrence after amputation of the breast, is rapidly disappearing. A malignant tumor of the tongue that had increased the size of the organ to such an extent as to prevent absolutely the taking of all nourishment, so that the patient had to be nourished by the rectum, was caused to ulcerate by exposure to the X-rays, and the tumor has decreased so much that, whereas a teaspoonful of water could not be taken before, the patient is now able to eat steak and other nutritious substances, has gained in weight and has taken on a sense of well-being that had been absent for a long time.

Lessened Chance of Burns.—Dr. Williams, in closing the discussion, said that, in his experience, when the screen is employed there is much less chance of burning the patient. It is possible to produce a brush

burn with electricity when the X-rays are not employed at all. Dr. Williams confesses that patients are not absolutely protected from all danger of burns even by the screen, though there is undoubtedly much less risk. As burns are the one serious drawback to the use of the X-rays, it is worth while to take the precautions thus suggested. In using the X-rays in cavities of the body, Dr. Williams believes that they should be employed through funnels of glass, instruments easily used and absolutely shutting off the rays from all points that it is not desired to affect. This protection for the healthy tissues, especially the healthy mucous membrane, is very important and should not be neglected. The danger at the present moment is that, in the enthusiastic use of the X-rays by unskilled operators, serious damage will be done, bringing this method of treatment into uncalculated disrepute. Insistence on precautions that seem demanded by the experience of operators who have extensively used this method of treatment is an extremely important matter. No harm can possibly result, the patient will be better protected, no true therapeutic effect of the X-rays is diminished and a proper sense of security in their employment is obtained.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON ORTHOPEDIC SURGERY.

Stated Meeting, Held January 17, 1902.

George R. Elliott, M.D., Chairman.

Webbed Fingers.—Dr. W. R. Townsend presented a baby four months old, showing a mild type of webbed fingers. The webbed hand was the smaller, the fore and middle fingers showing the web; no other congenital deformities were present. No explanation was offered to account for the extreme smallness of the webbed hand.

Hemihypertrophy of the Bones of the Face and Head.—Dr. Townsend also presented the case of a girl four years old. The right side of the face and head seemed larger. When first seen edematous tissue over the back of the head rendered it difficult to determine whether the bones were enlarged or not. The edema subsequently decreased and an increased size of the occipital and right parietal bones was manifest. The frontal bone was not involved, but the right inferior maxillary bone appeared enlarged. There was no history of syphilis; lower extremities were developed. The child had an enlarged abdomen and the deformity known as chicken-breast. The exact diagnosis was puzzling, the question being whether it was leontiasis or rachitis.

Aspiration Treatment of Abscesses.—A boy, eight years old, was also presented by Dr. Townsend, who, January 9, 1901, gave the history of hip disease of one year's duration. There was an abscess on the outer aspect of the thigh which was aspirated April 6th; it refilled, was again aspirated on April 29th and again on May 11th. The abscess did not recur. The case was presented to illustrate the successful treatment of these abscesses by aspiration. He said abscesses not interfering with application of braces, those not burrowing, and those not in a condition of mixed infection could be safely let alone or aspirated.

Dr. Nathan, in discussing the case of hemihypertrophy, stated that after careful study of the literature of reported cases of leontiasis ossea, it did not appear that there was any agreement between authorities as to the definite lesions constituting this condition. All the reported cases differed from one another and the one presented differed in many respects from all cases noted in the literature of the subject. He said that originally

in the case presented there was a distinct cleft in the occipital bone. There was certainly some enlargement of the occipital bone as determined by measurements, but the hypertrophy of the soft parts over the lower maxilla made it difficult to measure that bone.

Dr. V. P. Gibney, in discussing the case of abscess treated by aspiration, presented statistics from his private records of twenty-three cases treated by aspiration, fifteen of which were cured. Of these fifteen, in three cases the aspiration was done once; in four cases, twice; in four cases, three times; in four cases, four or more times. Of the remaining eight, three were aspirated once, but the needle was large and caused leakage and sinus formation; four were aspirated twice; in one spontaneous opening took place a few days later. In all cases not cured there was no damage done by the aspiration.

Dr. T. Halsted Myers expressed himself as in favor of non-operative treatment when the tuberculous abscesses were not infected and were not interfering with the patient's health or threatening another joint. He had seen many cases cured without operative interference and considered this best in dispensary practice; aspiration should be tried before more radical operative measures.

Dr. R. H. Sayre said that he had aspirated frequently and sometimes secured good results, sometimes not. He had seen many cases get well without treatment and cited one case of recurrent abscess of the thigh; if these abscesses could not be opened and kept surgically clean, he advised aspiration, or, if this were not practicable, that they be let alone.

Dr. George R. Elliott asked Dr. Gibney if his statistics included any spinal abscesses.

Dr. Gibney replied that they referred to abscesses connected with the hip only. He further stated that he had had cases of spontaneous disappearance, but that most of the psoas abscesses had been of long duration that had been given up under the expectant plan of treatment.

Torticollis.—Dr. Royal Whitman presented the case of a boy twelve years of age, illustrating treatment of severe torticollis by the open incision with overcorrection of the deformity. The operation was performed November 7, 1901, and resulted in correction of the deformity with no limitation of motion, all resistant structures were divided, the two insertions of the sternocleidomastoid muscle and the cervical fascia being the most important.

Dr. Myers said the operation should be done early. He had seen cases left until the individual was fifteen years old, in which the sternal ends of the clavicles had been partially dislocated upward by the short sternocleidomastoid; this was a deformity difficult to correct.

Congenital Anterior Displacement of the Hip.—Dr. Whitman presented a girl five years old, illustrating congenital anterior displacement of the hip. He said ordinary methods of replacement were not successful in such cases and whatever treatment was adopted must be supplemented by osteotomy of the femur, otherwise the head of the bone would be displaced when the parallelism of the limbs was restored.

Dr. Fiske said he thought the condition should be regarded as a superior displacement rather than anterior.

Dr. Whitman replied that he understood the term congenital anterior displacement of the hip to indicate that the head of the femur was directed forward, lying below and to the outer side of the anterior superior spine.

Dr. Whitman also presented a child aged three years. The non-cutting operation had been performed one

year previously. The plaster bandage was worn only seven months. This illustrated the fact that in certain cases of a favorable type cure might be accomplished in a short time, cure meaning both as to function and position. It was impossible to say from observation which hip had been originally displaced.

Double Congenital Hip Dislocation Treated by the Open Method.—Dr. Whitman presented a patient, a girl seven years of age, upon whom he had operated by the open method three years previously. The patient now walks with but slight swaying of the body; the lordosis has completely disappeared, and the permanency of the cure is assured by the lapse of time; there is practically no restriction of normal motion.

Dr. Elliott asked if the two operations were performed at the same time and if much acetabular scooping had been done.

Dr. Whitman replied that the operations were performed about three weeks apart; the heads of the bones in this case were easily replaced and very little scooping was necessary; he considered one advantage of the scooping that it caused adhesions which bound the bones more firmly and prevented subsequent displacement; the amount of scooping differed in different cases, some requiring a great deal, while in others simple arthrotomy might be sufficient. He further stated that after operations of this character the fixation bandage should be employed for many months, exercise and passive motion being useless until complete repair had taken place. In one instance he had fixed the limb for eight months and at the end of that time the motion was far less restricted than in the majority of cases in which the restraint had been removed soon after the operation.

Phocomelia.—Dr. Henry Ling Taylor presented the case of a girl five and one-half years old, the second of four children; no developmental anomalies in the family. The mother stated that the feet presented, and that something was wrong with the shoulder at birth, which was rectified by the physician. When the child began to walk at fourteen months, a slight lameness on the left side was noticed which has persisted. Motion at the hip was normal, but the left leg was two inches shorter than the right, the shortening being confined to the femur; the trochanters were in normal position and the classical signs of congenital dislocation and coxa vara were absent. He offered the diagnosis of congenital shortening of the left femur, confirmed by a skiagraph which showed the femur to be short and small. The points of interest were the differential diagnosis, the slight lameness with considerable shortening, which was the rule when the joint motion and muscular power were good, and the absence of true lateral curvature with a markedly sloping pelvis, which was also the rule.

Dr. Elliott asked Dr. Taylor for the etymology of the word phocomelia. Dr. Taylor replied that it was derived from two Greek words meaning seal and limb, the combination being equivalent to flipper deformity. The term had reference to imperfect development in length of one or more of the long bones of the extremities.

Dr. Sayre considered that the term phocomelia should be restricted to the extreme cases in which the long bones were either absent or almost entirely so, but Dr. Taylor responded that Kummel, Klausner and other authorities applied the term to such cases as the one presented.

Dr. Alfred Taylor presented a case of webbed fingers. The patient was operated on recently, but some of the fingers were in a condition to show the results of the operation. The patient, a boy, was born with three fingers of each hand entirely webbed to the tips. On the middle and ring fingers of both hands the bases of the

terminal phalanges had grown together, the little finger showed no bony union. The first operation was done in November on the little finger of the left hand. Later the entire condition of the right hand was relieved by operation. The method was to make an incision on the dorsum of one finger and palmar surface of the other, dissect up the flaps, using the opposite flaps to cover the fingers. In the little finger primary union was obtained. Instead of making a crosscut at the base of the flap or instead of making a V-shaped flap, the incision was simply carried to the full distance up toward the web in each case, when it was found that by suturing the edges together the edge of one flap would obliquely cross the edge of the other in an opposite direction, the two edges meeting in the middle. This method worked very well.

"The Operative Treatment of Webbed Fingers with Presentation of Cases."—This was the title of a paper read by Dr. Sayre. He reviewed briefly the classical methods of operation and illustrated on a model his method of operation, by making a flap for one finger and grafting to cover the other, then taking an A-shaped flap from the dorsum of the hand, slipping it over and stitching it to the palm to form the bottom of the web. In methods which did not employ a graft from some other part of the body to cover the inner side of one finger, the effort was made to cover a defect with insufficient material, since the web connecting two contiguous fingers was much less extensive than the amount of skin which would cover the contiguous margins of those fingers normally and pass into the interdigital cleft. For demonstration a stuffed glove of one color was slipped inside one of a different color, the fingers of the latter being sewed together to present webbing after the removal of the piece of kid lying on the contiguous sides of the webbed fingers.

Dr. Myers considered grafting a great improvement over the other methods in these cases. Only the bottom of the cleft need be covered by a flap.

Dr. V. P. Gibney stated that he had always used the Didot method of operation, but thought Dr. Sayre's plan an excellent one.

Dr. Sayre presented a patient upon whom he had operated for webbed fingers. The fingers were webbed to the tips and the phalanges united by bony union. The case illustrated the method of making a flap for one finger and using skin graft for the other.

BOOK REVIEWS.

PRACTICAL MEDICINE SERIES OF YEAR-BOOKS. GENERAL SURGERY. Edited by Dr. JOHN B. MURPHY. The Year-Book Publishers, Chicago.

In the admirable library comprised in the "Practical Medicine Series of Year-Books," the volume on Surgery for the past twelve months was assigned to Prof. Murphy of Chicago. The name of the editor is a sufficient guarantee of the practical value of the book, which is written from the standpoint of the clinician and of the operative surgeon rather than from that of the pathologist or of the student.

Every branch of the subject, from anesthetics to military surgery, is discussed in such a way that the reader arrives at a very fair idea of the most notable advances that have been made, and also of the critical attitude of the rest of the profession toward the theories that have recently been advanced. The various topics, including such matters as spinal anesthesia, the etiology of tumors, the new methods of diagnosis in kidney diseases, and so forth, are treated with marked fairness and impartiality. The only fault

which one could find with the volume is that it takes comparatively too little note of foreign contributions, although the American journals are very well sifted and analyzed.

LAMARCK. THE FOUNDER OF EVOLUTION. His Life and Work. With Translations of his Writings on Organic Evolution. By ALPHEUS S. PACKARD, M.D., LL.D. Longmans, Green and Co., New York, London and Bombay.

It is not a rare occurrence in this hurly-burly world that the germs of fruitful and even epoch-making ideas are lost for many a year to break forth into life and vigor. At the present time when Neo-Lamarckism and Neo-Darwinism are set forth as rival claimants to the position of the true light of interpretation for evolution it is a pleasure to have a work of this kind and to learn more of the life of a man whose great ideas were lost in the light of Darwin's intellect.

Dr. Packard, whose work with insects has endeared him to every student of this branch of science, has given us a labor of love in this excellent biography. In his own inimitable style he has made Lamarck a living personality and he has moreover set before the science-loving world a clearer picture of the fundamentals of organic evolution than has been vouchsafed for many a year.

We recommend this volume most cordially to all those who enjoy the story of the lives of those who have made science.

THE PRINCIPLES OF PATHOLOGICAL HISTOLOGY. By HARVEY R. GAYLORD, M.D., Professor of Surgical Pathology in the University of Buffalo, and LUDWIG ASCHOFF, M.D., Professor and First Assistant in the Pathological Institute of Göttingen. With an Introductory Note by WILLIAM H. WELCH, M.D. Lea Brothers & Co., New York and Philadelphia.

For beauty of illustration and marked originality in conception this work stands out in sharp contrast to other works along similar lines of study. The reviewer does not recall any work of just this character as having appeared in recent years at least. It has all the advantages of a collaboration with a coworker in Professor Orth's laboratory at Göttingen and is adapted to the use of American students at the same time.

Each year sees marked improvement in the text-books for students of medicine in the United States, and it may be asserted without fear of contradiction that the present work is one of the best results of the art of good book-making and withal an immensely valuable guide to the student of pathological histology.

The work is to be most cordially commended as complete, authoritative, and at the same time a work of art. The chapter on Photomicrography is especially commendable for its simplicity as well as for its thoroughness.

STUDIES IN PHYSIOLOGICAL CHEMISTRY. Being Reprints of the more Important Studies Issued from the Laboratory of Physiological Chemistry, Sheffield Scientific School of Yale University, during the years 1897-1900. Edited by R. H. CHITTENDEN, Ph.D., Professor of Physiological Chemistry and Director of the Sheffield Scientific School. Charles Scribner's Sons, New York.

There is one feature of this work that impresses the reviewer above all others and which makes it even more important and pleasant to speak of the man than of the work. There is a great fertility of intellect, a driving energy and a great sympathetic interest, all made manifest in the records of Dr. Chittenden's work. In the opening pages a bibliography is appended of a large list of studies in which, one after another, the guiding and

stimulating interest of the teacher has trained the young student along lines of great usefulness.

Such men are needed in the medical schools of this country and it is a pleasure to note that there are to be found, now all over the country, many of them trained in this self-same laboratory of the work of which the present volume is but an index.

It is gratifying to the student trained in physiological chemistry to be able to have these collected essays of the last three years in a handy volume. We trust that many such volumes may be issued.

A SYSTEM OF PHYSIOLOGIC THERAPEUTICS. Edited by SOLOMON SOLIS COHEN, A.M., M.D. Volume VI, Dietotherapy and Food in Health. By NATHAN S. DAVIS, JR., A.M., M.D. P. Blakiston's Son & Co., Philadelphia.

It is a cheerful sign of the times that the practising physician has made for his use text-books on practical subjects which closely follow the onward march of the more technical subjects. Such are, in the reviewers' parlance, termed "up to date." This work is of this class, and not yet wholly has the author been enabled to shake away from many of the traditional garments which have covered the dry bones of physiological chemistry.

When conflict seems to arise in the matter of food products and their values, between the chemist and the clinician, it behooves both to examine their ground more thoroughly, in order that the former may recognize the difference between test-tube reactions, strict physical chemics and the living chemistry of the body; and in order that the clinician may make haste slowly in jumping to conclusions as to the why and wherefore of good or bad results obtained.

The present work exemplifies in some measure an avoidance of both difficulties by calmly bolting both boluses and letting the reader work out his own salvation. Still, there is too little of this in any way to detract from the usefulness of the work. It is a very excellent one and is worthy of the highest commendation.

A TEXT-BOOK OF PHARMACOLOGY AND SOME ALLIED SCIENCES (THERAPEUTICS, MATERIA MEDICA, PHARMACY, PRESCRIPTION-WRITING, TOXICOLOGY, etc.). By TORALD SOLLMANN, M.D., Assistant Professor of Pharmacology and Materia Medica in the Medical Department of the Western Reserve University, Cleveland, Ohio. W. B. Saunders and Co., Philadelphia and London.

It has rarely been our fortune to review so clear, concise and well-arranged a work as this treatise by Dr. Sollmann, which will, no doubt, quickly gain that confidence among students which it justly deserves. The pharmacist will find welcome information which other books on the same subject usually neglect and which nevertheless are essential for the broader conception of the subject.

The introductory chapters treat of pharmacognosy and the method of pharmacy and prescribing, then follow materia medica and therapeutics proper, while the last hundred pages consist of a chapter on practical exercises in chemistry and a very valuable one on the general technic of pharmacological research to which are appended several tables on solubility and dosage. Both the metric and the old system of weights are used and the British Pharmacopoeia is considered, as well as our own. Short articles interspersed among the text upon the mechanism of the normal physiological processes greatly help to elucidate the action of the drugs and the tables comparing those of the same class with each other will prove of great value.

That the book is thoroughly up to date is proven by the consideration of such drugs as heroin, dionin, eucaïne, hedonal, etc., and by articles on the subarachnoid injections of cocaine, and on internal secretions.

We regret to see that the dose of dionin has been omitted and that no mention has been made of the fluorides in the paragraph on preservation of food. Phloridzin among internal secretions is rather out of place and the toxicology could be a little more full, especially of such drugs as arsenic.

The article on anesthesia is good and worthy of a purely medical book; the same may be said of the very excellent table on antitoxins and protective serums. On the other hand, the chapter on specific infections is unnecessary in a book of this character, and, on account of its brevity, is scarcely instructive. There are about 100 illustrations, in the main schematic. We consider the book one of the best of its class and wish it every success.

THE PERVERTS. By WILLIAM LEE HOWARD, M.D. G. W. Dillingham, New York.

IN novel form the author has most skilfully depicted the clinical history of a neurotic family. Sprung from the union of a worn-out man with partly "dried up New England school teacher," as the author puts it. Three daughters and one son, the hero, result from this marriage.

The chief interest centers in the son who has dipsomaniacal attacks. These are exceedingly well sketched and the author is to be congratulated on handling this difficult subject in so just and sensible a manner. His presentation has the fullness of truth in it. The hero is saved by his own study of the morbid process, as he is a physician, and he is helped by a sympathetic and noble woman whom he weds. One sister is a dominant figure in the story; she develops scientific tastes, enjoys animal experimentation, uses bacteria-infected whistles in trying to poison off her nephew and finally develops the erotic perversions of the flagellants.

The story is well told and offers an interesting study in morbid psychology.

BOOKS RECEIVED.

The MEDICAL NEWS acknowledges the receipt of the following new publications. Reviews of those possessing special interest for the readers of the MEDICAL NEWS will shortly appear.

COMPEND OF GENERAL PATHOLOGY. By Dr. A. E. Thayer. 12mo., 321 pages. Illustrated. P. Blakiston's Son & Co., Philadelphia.

HANDBOOK OF BACTERIOLOGICAL DIAGNOSIS FOR PRACTITIONERS. By Dr. W. D'Este Emery. 8vo., 216 pages. Illustrated. P. Blakiston's Son & Co., Philadelphia.

ENZYMES AND THEIR APPLICATIONS. By Dr. J. Effront. Translated by S. C. Prescott, S. B. Vol. I, The Oxidases. 8vo., 320 pages. John Wiley & Sons, New York, \$3.

LES FILATURES DE LIN. By Dr. D. Glibert. 8vo., 465 pages. Illustrated. Brussels.

THE POCKET GRAY OR ANATOMIST'S VADE-MECUM. By Dr. E. Cotterell. Fifth Edition, Revised and Edited. C. H. Fagge, 12mo., 270 pages. William Wood and Company, New York.

THE AMERICAN YEAR-BOOK OF MEDICINE AND SURGERY. Edited by Dr. G. M. Gould. 2 vols. 8vo. W. B. Saunders & Company, Philadelphia and London.

VIIE VORLESUNGEN AUS DER ALLGEMEINEN PATHOLOGIE DES NERVENSYSTEMS. By Dr. F. W. Mott. 8vo., 112 pages. Illustrated. J. F. Bergmann, Wiesbaden; Stechert, New York.